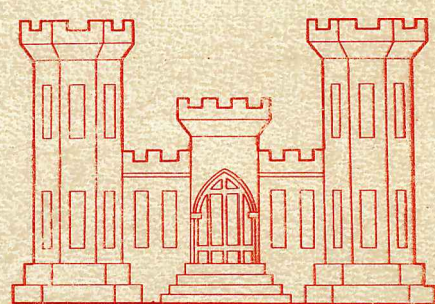


FORT BRAGG, NORTH CAROLINA

TERRAIN ANALYSIS



PREPARED BY
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FORT BRAGG, NORTH CAROLINA 28307
CARTOGRAPHIC AND REPRODUCTION SUPPORT BY
63D ENGINEER COMPANY (TOPOGRAPHIC) (CORPS),
FORT BRAGG NORTH CAROLINA 28307

UNDER THE DIRECTION OF
THE TERRAIN ANALYSIS CENTER
U S ARMY ENGINEER TOPOGRAPHIC LABORATORY
FORT BELVOIR, VIRGINIA 22060

NOVEMBER 1977

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I. INTRODUCTION

BACKGROUND

The requirement for this terrain analysis of Fort Bragg was stated in message P241854Z Oct 75 from the Commander, FORSCOM, to the Office, Chief of Engineers (OCE), Department of the Army, subject: "Terrain Analysis of Selected FORSCOM Installations." The FORSCOM requirement identified 13 installations (later amended to include a total of 17) including Fort Bragg, and cited topical coverage to be included in the studies. Responsibility for management and supervision of the program developed in response to the FORSCOM requirement was assigned by OCE to the Terrain Analysis Center (TAC), US Army Engineer Topographic Laboratories. At FORSCOM's request, TAC responsibility also includes technical supervision and direction of FORSCOM troop units assigned to the program.

Scope and content of the topical coverage included in the FORSCOM requirement were developed jointly between representative of TAC and FORSCOM headquarters. Analytical and cartographic specifications for the studies were developed by TAC, coordinated with OCE and concurred in by FORSCOM headquarters.

PURPOSE

In stating the requirement for terrain analysis of selected installations, FORSCOM indicated that the purpose of the program is to assist military planners in future stationing decisions. To achieve this purpose, planners must obtain an appreciation of the on-post terrain that includes among many other things, knowledge of the suitability for conducting field training exercises involving maneuverability of troops and military vehicles. The degree of maneuverability that can be achieved is a function of several terrain factors including slope, surface configuration, soils, vegetative cover, and surface drainage, all of which are treated in the studies.

Planners concerned with troop stationing also need certain off-post information such as statistics on housing, schools, hospitals, and public utilities in urban areas near installations, as well as pertinent data on airfields and ports in the vicinity. These things are also treated in the studies.

Since the program under which this study was prepared is intended to serve troop stationing requirements, the support provided by the program to environmental requirements is only incidental. While some of the information contained in the studies may be useful as environmental base line data, the studies are by no means complete environmental inventories of the kind required in support of environmental impact assessments.

SCOPE

The terrain analysis is a compendium of available data concerning various pertinent natural and manmade features on the reservation and an evaluation of them for their effects on tactical military operation. The analysis was not intended to include basic research, but some short term field investigations were performed where no basic source materials were available. Therefore, the scope of the analysis is limited primarily to those factors which have been documented by other authorities and to evaluation of these factors for their effects on such topics as cross-country movement, cover and concealment, and water resources. Analytical judgement was involved in the selection of pertinent source data, in the resolution of conflicts, and in the recognition of inter-relationships not previously identified.

LIMITATIONS

The study is limited by the quality, quantity, and currency of the source data on which it is based. Numerous field interviews were employed in an effort to insure presentation of the latest and best information; however, there are a number of aspects on which source data have not been generated recently enough or with the focus desired to meet objectives fully. The data obtained from field reconnaissance should be interpreted only indentifying broad trends and should not be interpreted as definitive indicators in all respects.

PRESENTATION

Maximum use of graphic presentation has been made throughout the terrain analysis. Supporting text is, as far as practicable, in tabular format keyed to the related graphics which follow. The primary map scale is 1:50,000. For Urban Areas (Cantonment Area) the scale of the map is 1:50,000 and Off-Post Features the map scale is 1:1,000,000.

STUDY AREA

The Fort Bragg Military Reservation is located on a portion of the Atlantic Coastal Plain in southeastern North Carolina, approximately 50 miles south of Raleigh. The reservation is irregular in shape, extending about 27.6 miles east-west and 12 miles north-south at its widest extent and covers an area of approximately 136,000 acres (213 square miles). It includes parts of Cumberland and Hoke Counties, and lies between 35° 13' and 35° 02' North, and 79° 22' and 78° 54' West. The reservation is readily accessible by major east coast thoroughfares, US 301 and Interstate 95, and is crossed north-south by North Carolina routes 210 and 87.

The surface is largely gently rolling with elevations ranging from 46 to 162 meters above sea level. Slopes are generally less than 8% but locally reach 30%. The center of the reservation contains gently rolling sandy ridges, where the drop zones are located. Marsh-like areas are along stream bottoms where the drainage is usually poor. The soil is mainly a clay-sand mixture. Fifteen manmade lakes have been developed on several of the streams which flow mainly northward and southward. Much of these rolling surfaces are covered by coniferous forest, predominantly longleaf pine, with considerable undergrowth. The climate is humid subtropical with hot, humid summers and mild winters; snow rarely occurs.

II. DESCRIPTION AND MILITARY ASPECTS OF TERRAIN

A. SURFACE CONFIGURATION

The entire Fort Bragg reservation is coextensive with other parts of the greatly elongated physiographic province known as the Atlantic Coastal Plain. As such, it has prevailingly low-level surfaces ranging from 46 meters (170 ft) above mean sea level to 162 meters (535 ft). The reservation is moderately dissected by many streams superimposed on the gentle eastern slope of the Coharie Terrace. Slopes are generally 3 to 8 percent over large parts of the nearly level terrace; locally, slopes may reach upwards of 15 to 30 percent in a few scattered areas

LANDFORM TYPE	LANDFORM DESCRIPTION AND DISTRIBUTION	ELEVATIONS
1. Low Plains	Predominantly gently rolling surfaces with slopes largely between 0 and 8%; local relief of interstream areas generally 27 to 40 m (90 to 130 ft) above adjacent valley bottoms. Gently rolling surfaces in the southwestern, central and southeastern parts of the reservation with slopes mainly between 3 and 8%. Steepest slopes along upper reaches of streams largely between 8 and 15%. Flattest areas along stream bottoms and between Preacher's Road and Mail Route Road, hillock tops between McDuffie Creek and Puppy Creek, between Puppy Creek and Little Rockfish Creek, and between Little Rockfish Creek and Bones Creek in the central and southeastern parts of the reservation; slopes 0-3% along stream bottoms and on tops of hillocks with slopes generally 3-8% moving toward stream bottoms.	Rising gradually east to west, mostly between 55 to 107 m (180 to 350 ft) above sea level. Lowest elevation, 46 m (150 ft) northwestern boundary of Pope AFB along Little River. Highest elevation, 123 m (405 ft) along Charles Road.
2. High Plains	Predominantly irregularly shaped, moderately rolling surfaces covering three large areas: one in the southwestern edge of the reservation; largest area in the northwestern to central portion of the reservation; and, the third area in the northeastern portion of the reservation; all three areas with slopes largely between 3-8%. Steepest slopes, 15% in the southwestern portion along upper reaches of tributary of Wolf Pit Creek. Steepest slopes in northwestern and central portion on hillocks known locally as Gaddys Mountain with slopes 15%, and around hillocks known locally as Finlayson Mountain with slopes between 15-30%. Steepest slopes in northeastern portion of high plains in area between McKeller Road and Lamont Road with slopes of 15%. Flattest areas within impact ranges between Mail Route Road and Preachers Road, Preachers Road and MacRidge Road, and between Lamont Road and Corham Road, Holland Drop Zone in the northwestern portion of the reservation, Salerno Drop Zone along Raeford and Vass Road, and Normandy Drop Zone along Blues road, and scattered hillock tops. Differences in heights between interstream areas and hillock tops and adjacent valley bottoms generally over 55 m (180 ft).	Mostly between 76 to 140 m (250 to 460 ft) above sea level in all three areas. In southwestern area, highest elevation 162 m (535 ft), lowest elevation 78 m (255 ft); in northwestern and central area, highest elevation 162 m (535 ft); lowest elevation 73 m (240 ft) along Juniper Creek; in northeastern area, highest elevation 143 m (468 ft); lowest elevation 64 m (210 ft) along Stewart's Creek

B. SURFACE DRAINAGE

All surface water on Fort Bragg eventually drains into either the Little River or Rockfish Creek. Both of these streams empty into the Cape Fear River, which flows over 100 miles eastwardly to the Atlantic Ocean. A drainage divide stretching from east to west across the center of the reservation almost equally separates the drainage pattern into northwardly and southwardly flowing streams. The only permanent stream gage on the reservation is maintained on Flat Creek by the U.S. Geological Survey. Gaging data indicate that the high water period is January through April; the low water period, July through September.

Except under extreme climatic conditions, the streams and lakes do not freeze over. The greatest likelihood of freezing occurs during January and February. During the severe winter of 1976-77 ice up to 10 cm (4 inches) thick accumulated on most lakes for as long as two weeks on three separate occasions between December and February. No appreciable accumulation of ice on streams was observed. An analysis of flood prone areas indicates that excessive flooding is expected only along a limited stretch of the Little River in the vicinity of the water purification and sewage treatment plants at the northeastern corner of the reservation.

DRAINAGE CHARACTERISTICS

DRAINAGE CATEGORIES	GENERAL	REGIME	WIDTH	BANKS	BOTTOMS	DEPTH	VELOCITY & DISCHARGE
Watercourses							
Little River	The irregular meanders of the Little River are incised into a moderately large flood plain bordered in places by capped terraces. The stream, which is not navigable, has been dammed by masonry structures at 2 points- 787948 and 726938. The latter dam has been breached and no longer stores water.	High water period- January through April; low water, July through September	Normal widths range from 6 to 12 m (20 to 40 ft); widths of 60 m (200 ft) occur during high water	Mostly sandy silt with some gravel; siltstone, poorly consolidated sandstone, and clay form the banks where meanders impinge upon valley walls. Banks exceed 2 m (6 ft) in height and most slopes exceed 60°. Some terraces exceed 9 m (30 ft) in ht. above water level with slopes less than 40°	Gravelly with some sand bars underlain by bedrock	Normally 2 m (6 ft) but may increase to 4 m (13 ft) during high water	Usually in the vicinity of .6 m per sec (2 fps) but may exceed .9 m per sec (3 fps) during high water and at constrictions of the channel. Minimum discharge: 52,500 lpm (32 cfs)
Rockfish Creek	The second largest stream of the reservation is characterized by poorly developed meanders, thick vegetation, and adjacent swamps.	High water period: January through April; low water: July through September	Normally in the vicinity of 3 m (10 ft); high water may increase width to 5m (15 ft)	Sandy with some silt and clay; organics present in swampy areas; slopes may exceed 45°.	Sandy with some clay & organics	Normally 1 m (3 ft); may exceed 2 m (6 ft)	Usually in the vicinity of .3 m per sec (1 fps); may increase locally up to .4 m per sec (1.5 fps). Discharge normally exceeds 40,000 lpm (24 cfs)
James Creek	The largest tributary to the Little River at Fort Bragg, this stream develops a moderately large flood plain approximately 6,000 m upstream from its junction with the Little River. Dense vegetation chokes most of the upper reaches of the channel, swamps are present in lower reaches where the stream ponds slightly; some braided channels present.	High water: January through April; low water: July through September	Ranges from 2 to 17 m (6 to 50 ft)	Heights normally exceed 1 m (3 ft) and may exceed 2 m (6 ft); often sandy, sometimes clayey; slopes seldom exceed 40°.	Sandy with some clay and gravel; in places bedrock is exposed	.3 to 2 m (1 to 6 ft)	Velocity occasionally exceeds .3 m per sec (1 fps); discharge normally in vicinity of 20,000 lpm (12 cfs).
Other Streams	Occupy small to moderately large flood plains bordered by valley walls with steep to gently sloping sides; swamps adjacent to some streams	Same high and low water periods as major streams	Less than 3 m (10 ft)	Heights seldom exceed 1 m (3 ft), slopes are less than 45°; sandy with silt, clays, and organics.	Silty and sandy with some clay	Normally less than 1 m (3 ft)	Usually in the vicinity of .3 m per sec (1 fps); often less; normal discharge usually less than 10,000 lpm (6 cfs)
Standing Bodies of Water							
Wet Areas	Wet areas consist of swamps and perennially water-logged lowlands generally occurring on the flood plains of most larger streams. Drainage is poor because of organic deposits, clayey soils, low surface gradient and infiltration of stream-flow.	Same high and low water periods as major streams	200 to over 500 m (600 to 1800 ft)	Normally bounded by valley walls of varying heights.	Sandy soils overlain by organics less than 1 m (3 ft) thick	.2 m (5 ft) or less in most areas	Imperceptible flow
Reservoirs	See table (Reservoirs) for additional information.	The height of water is regulated; however, many lakes are lowered approx 1 m (3 ft) in October or November annually and then allowed to build up gradually beginning in March	Varies; normally less than 500 m (1,500 ft)	Banks are usually gently sloping and sandy with some clay. Smith Lake is bounded by steep cliffs.	Sand with some silt or clay and usually relatively free of thick organic deposits. Some bottoms are covered with stumps and trees or shrubs and undergrowth	Normally less than 5 m (15 ft) except for Kiest Lake which is almost 6 m (20 ft) deep in some places	See table (Reservoirs) for discharge

B. SURFACE DRAINAGE (Continued)

RESERVOIRS					
MAP NO.	NAME	GRID COORDINATES	ESTIMATED YIELD IN LPM*	APPROX SURFACE AREA IN HECTARES/ACRES	STRUCTURE OF DAM**
1	Lake MacArthur	585948	789	18/45	Double spillway with concrete steps
2	Mott Lake	635800	1840	38/96	Culvert with stepped concrete spillway
3	Kiest Lake	729928	237	4/10	Horizontal underdrain with vertical riser
4	Wyatt Lake	738928	158	3/8	Horizontal underdrain with vertical riser
5	Upper and Lower McKellars Lake	778922	526	16/39	Concrete and plywood spillway
6	McFayden Pond	812922	131	5/13	concrete spillway
7	Simmons Field Lake	872903	184	4/10	Information not available
8	Texas Pond	884906	131	7/17	Concrete and timber spillway
9	Andrews Church Lake	877932	13	.3/.6	Information not available
10	Smith Lake	889890	789	25/62	Concrete spillway
11	Boundary Line Lake	905945	526	6/14	Information not available
12	Cross Creek Lake	885889	273	2/5	Horizontal underdrain with vertical riser
13	Young Lake	832933	39	.4/1	Information not available
14	Holland Lake	558936	210	4/10	Information not available

*Sustained rate which would be maintained indefinitely independent of recharge.

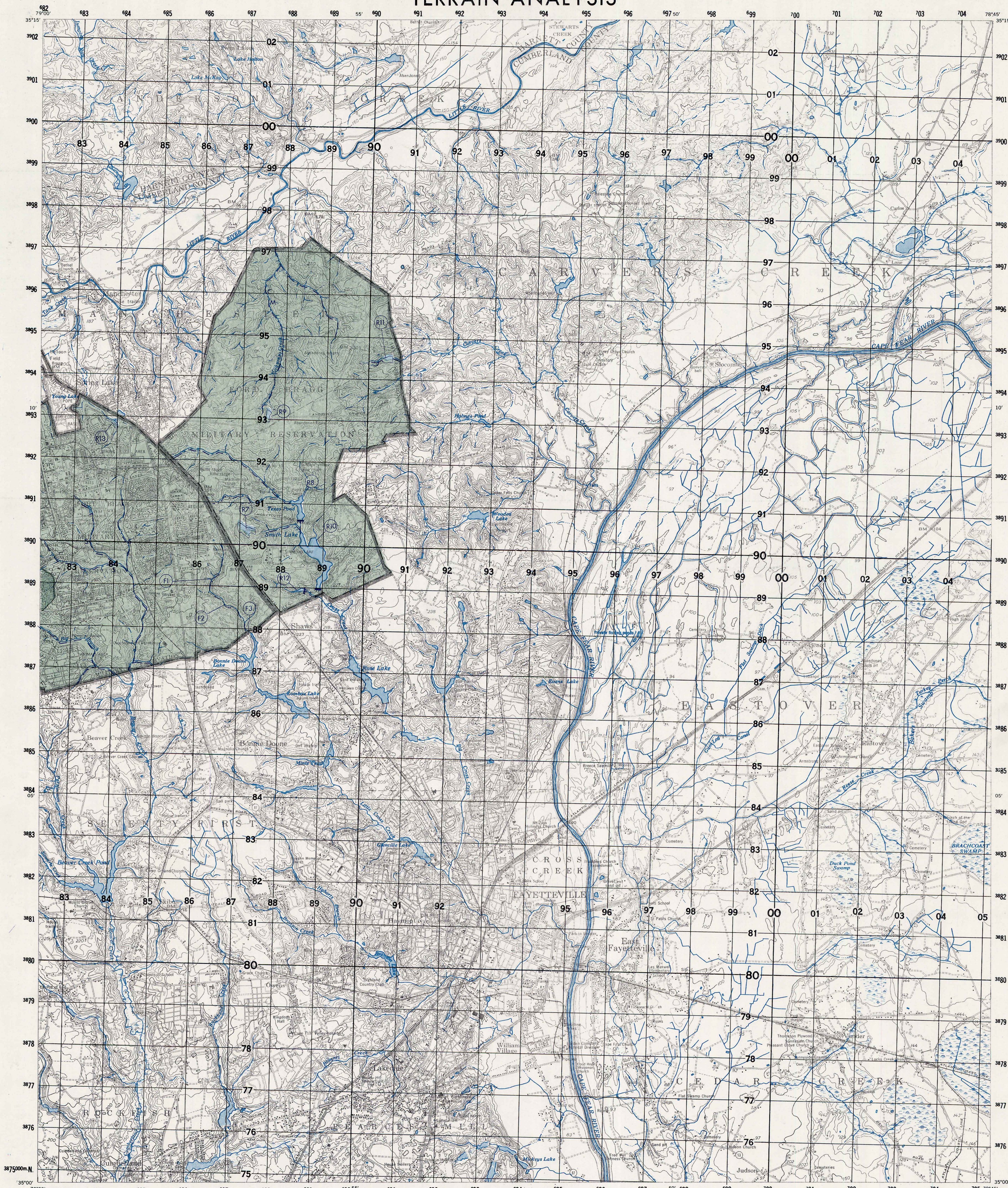
**All dams are earth fill.

FORDS				
GRID COORDINATES	BOTTOM	APPROXIMATE DEPTH m/ft	APPROXIMATE WIDTH m/ft	REMARKS
1 864892	Sand	.6/2	3.6/12	Gentle approaches; suitable for all tactical traffic.
2 867885	Sand	1.5/5	3.6/12	Steep approaches, unimproved dirt road. Suitable for all tactical traffic except 1/4 T trk.
3 873879	Sand	.6/2	3.6/12	Unimproved dirt road; suitable for all tactical traffic.
4 635799	Sand	.6/2	4.3/14	Gentle approaches, suitable for all tactical traffic.
5 701821	Sand	.3/1	3.6/12	Small logs on western side lessen the slope of the western approach; suitable for all tactical traffic.

These fords are only representative and were identified during a limited field reconnaissance. Because they are usually surrounded by thick vegetation and loose, organic, saturated soils, most perennial streams and their tributaries are impassable most of the year. Only tracked vehicles may be able to cross some streams during extended periods of dry weather when the reduction of moisture results in firmer soils on the approaches.

MEAN MONTHLY DISCHARGE	
DISCHARGE DATA RECORDED FOR FLAT CREEK NEAR INVERNESS DURING WATER YEAR 1975*	
General Information	
Location of gage: Latitude 35° 10' 54", longitude 79° 10' 40"	
Average discharge measured between 1968 and 1975: 23,500 lpm (13.8 cfs)	
Extremes in discharge measured during the water year of October 1974 to September 1975: Maximum: 222,600 lpm (131 cfs) recorded during July 17	
Minimum: 6,300 lpm (3.7 cfs) recorded during August 30, 31 and September 6, 7	
Extremes in discharge measured between 1968 and 1975:	
Maximum: 669,400 lpm (394 cfs) recorded during April 1, 1973	
Minimum: 6,300 lpm (3.7 cfs) recorded during many days between August and October 1968	
Mean Discharge for Water Year October 1974 - September 1975	
Month	Discharge (lpm/cfs)
Jan	16,400/9.64
Feb	19,500/11.5
Mar	25,300/14.9
Apr	34,300/20.2
May	36,500/21.5
June	34,700/20.4
July	27,300/16.1
Aug	25,800/15.2
Sept	17,200/10.1
Oct	28,500/16.8
Nov	16,800/9.89
Dec	26,000/15.3
* Information selected from Water Resources Data for North Carolina Water Year 1975, U.S.G.S. Water Data Report NC-75-1	

STREAM DISCHARGE MEASUREMENTS		
(Between 15 Dec 76 and 6 Feb 77 Under Bank Full Conditions)		
GRID COORDINATES OF POINTS	WATER COURSE	LPM/CFS
561915	Rockfish Creek	79,000/46
594815	Juniper Creek	24,000/14
702816	Puppy Creek	31,000/18
742804	Little Rockfish Creek	21,000/12
786836	Bones Creek	15,000/88
835872	Big Branch	24,000/14
837894	Beaver Creek	10,000/5.9
863890	Little Cross Creek	11,000/6.5
879945	Gibson Creek	7,000/4.1
659944	Flat Creek	23,000/13
638949	Horse Creek	18,000/11
588968	James Creek	30,000/18
800857	Stewarts Creek	8,500/5.0
798943	Little River	315,000/185 (estimated)



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Scale 1:50,000
1 1/2 0 1 2 3 Statute Miles
1000 500 0 1000 2000 3000 4000 Meters

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5154 II	5254 I	5254 II
5153 I	5253 IV	5253 I

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SURFACE CONFIGURATION

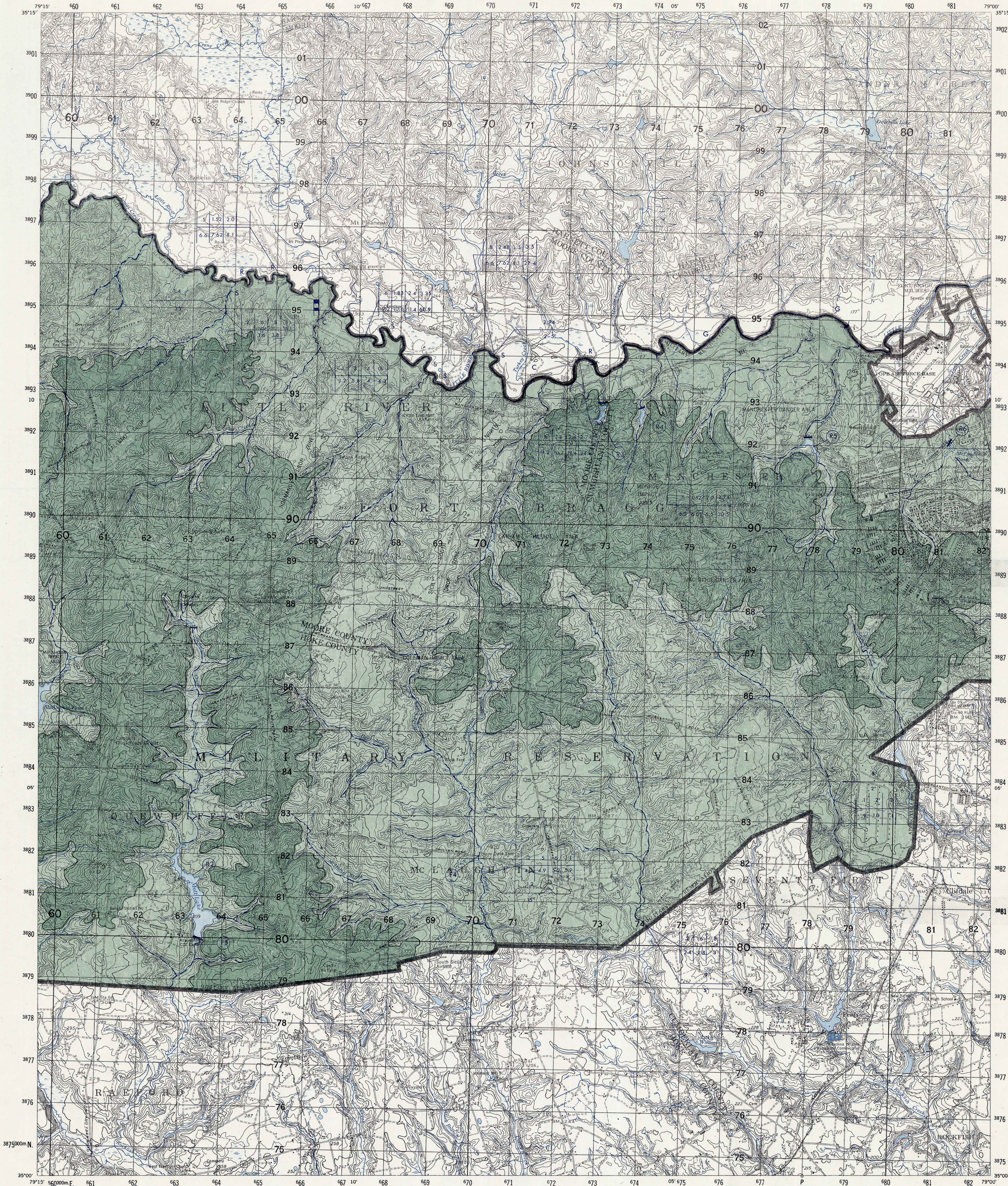
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- High Plains Predominantly moderate rolling surfaces. Local relief mainly from 55 to 65m.; slopes largely between 3 and 8% with slopes between 15 and 30% along upper stream valleys.

SURFACE DRAINAGE

- Stream Data (in meters)
- | | | | |
|---|---|---|---|
| A | C | E | G |
| B | D | F | H |
- A. Depth at Low Water
B. Width at Low Water
C. Depth at Normal Water
D. Width at Normal Water
E. Depth at Bank Full Stage
F. Width at Bank Full Stage
G. Depth at High Water
H. Width at High Water
- J. Bank Height
K. Bank Slope (degrees)
- Bottom Materials*
- | | |
|---|--------|
| S | Sand |
| R | Rock |
| M | Mud |
| C | Clay |
| G | Gravel |
- Watercourse Width**
- | |
|--------------------|
| 10-15 Meters |
| 3-10 Meters |
| Less than 3 Meters |
- Body of Water
- Wet Area
- Reservoir (R4)
- Ford (F4)
- Stream Gage
- Earthen Dam
- Masonry Dam

General Notes

*All stream bottoms are sandy unless otherwise noted.
**All measurements taken at normal water level.
Number on map refers to entry in table.

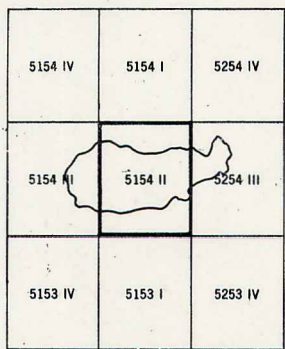


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ADJOINING SHEETS



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SURFACE CONFIGURATION

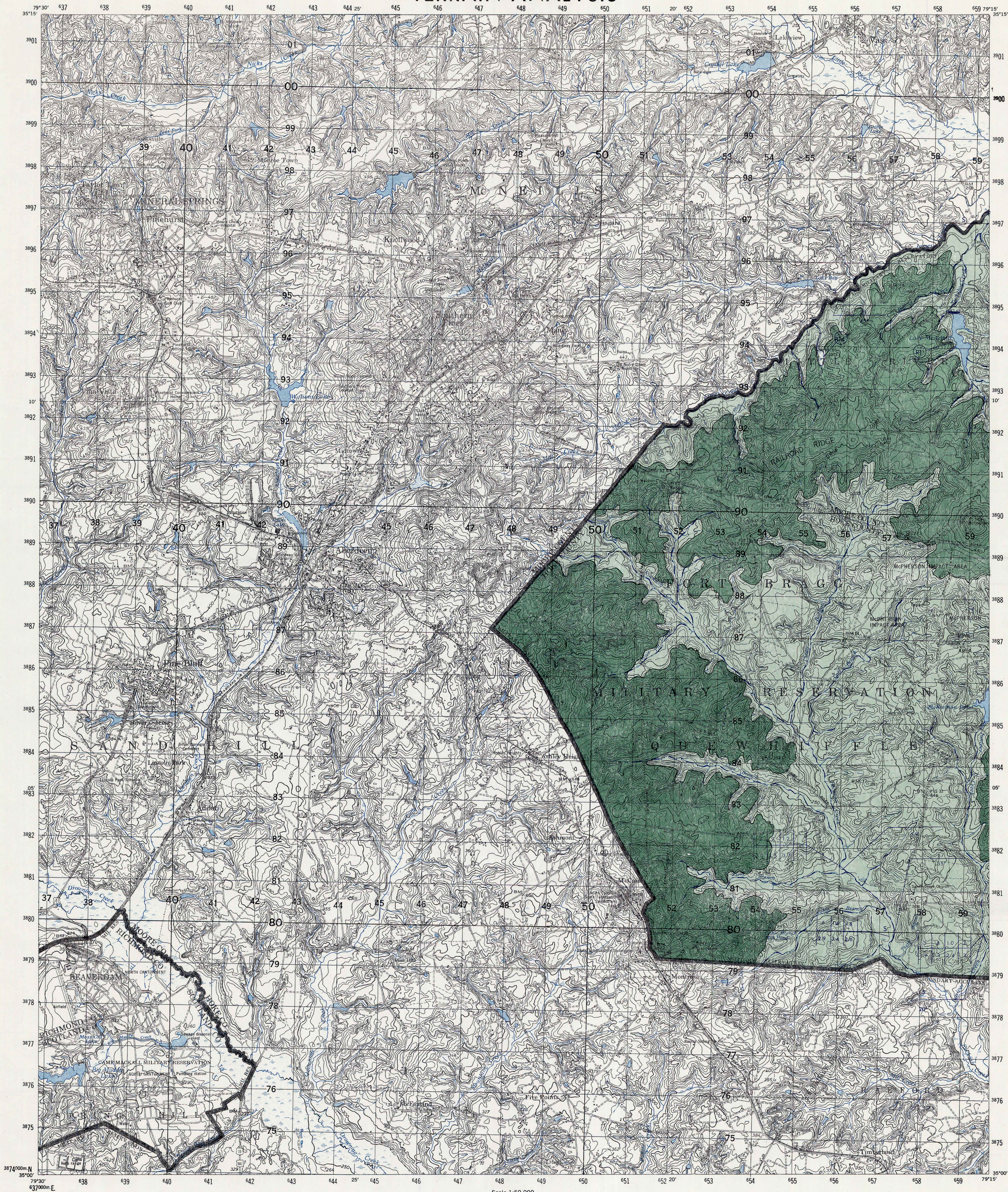
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SURFACE DRAINAGE

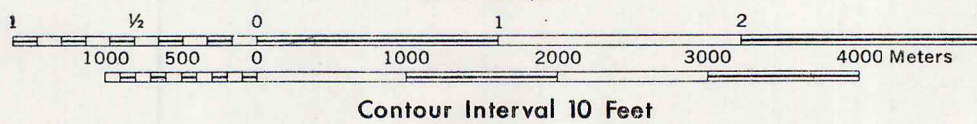
- Stream Data (in meters)
- | | | | |
|---|---|---|---|
| A | C | E | G |
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C. Depth at Normal Water
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E. Depth at Bank Full Stage
F. Width at Bank Full Stage
G. Depth at High Water
H. Width at High Water
- J. Bank Height
K. Bank Slope (degrees)
- Bottom Materials*
- | | | | | |
|---|---|---|---|---|
| S | R | M | C | G |
|---|---|---|---|---|
- Sand
Rock
Mud
Clay
Gravel
- Watercourse Width**
- | | |
|--|--------------------|
| | 10-15 Meters |
| | 3-10 Meters |
| | Less than 3 Meters |
- Body of Water
- Wet Area
- Reservoir
- Ford
- Stream Gage
- Earthen Dam
- Masonry Dam

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Number on map refers to entry in table.

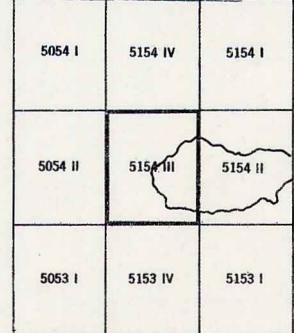


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INDEX TO ADJOINING SHEETS



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SURFACE DRAINAGE

- Stream Data (in meters)
- | | | | |
|---|---|---|---|
| A | C | E | G |
| B | D | F | H |
- A. Depth at Low Water
B. Width at Low Water
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K. Bank Slope (degrees)
- Bottom Materials*
- Sand
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Mud
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- Watercourse Width**
- 10-15 Meters
3-10 Meters
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- Body of Water
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- Reservoir
- Ford
- Stream Gage
- Earthen Dam
- Masonry Dam

General Notes

*All stream bottoms are sandy unless otherwise noted.
**All measurements taken at normal water level.
Number on map refers to entry in table.

C. WATER RESOURCES

1. SURFACE WATER

Surface water sources provide most of the fresh water consumed at Fort Bragg. Because of its size, the Little River provides more than adequate quantities and therefore is the only source with permanent treatment facilities. Mott and McArthur Lakes are periodically used as sources during field exercises. All surface water on Fort Bragg must be treated before use. In general, the northwardly flowing streams are the purest. Lakes usually lack significant pollution, although some lakes within the cantonment area are contaminated.

Stream data were primarily compiled from observations obtained during a limited field reconnaissance conducted between December 1976 and February 1977; most streams were observed during high-water. The high-water period on these streams is from January through April and the low-water period from July through December. Low-water data were extrapolated from high-water observations. Lake data were obtained from The Fish and Wildlife Section of the Directorate of Facilities Engineering.

MAP UNIT	SOURCES	QUANTITY	QUALITY	DEVELOPMENT OF SOURCES
1	Little River	Exceeds 40,000 lpm even during dry periods	Suitable for drinking, culinary, or food processing purposes after treatment; also suitable for lower quality uses.	Currently the primary source of fresh water for the reservation; permanent facilities for processing located at the northeastern corner of the reservation. Because of steep slopes, access to source at other location is limited to existing roads.
2	Rockfish Creek	All streams in this map unit with minimum ranges from 4,000 to 40,000 lpm, even during dry periods.	Suitable for agricultural usage and industrial and process water.	Generally inaccessible because of dense vegetation and poor drainage.
	Juniper Creek		Same as above.	Generally inaccessible because of dense vegetation and poor drainage; flood plain subject to flooding.
	Puppy Creek		Same as above.	Generally inaccessible because of dense vegetation; flood plain subject to flooding.
	Little Rockfish Creek		Same as above.	Generally accessible; much of stream accessible only through impact area.
	Big Branch		Suitable for fishing and fish propagation.	Generally accessible; numerous fire breaks improve accessibility.
	Flat Creek		Suitable as a source of water for drinking, culinary, or food processing purposes after treatment; suitable for lower quality use.	Generally accessible, although some steep banks locally present.
	Horse Creek	All streams and lakes in this map unit with minimum ranges from 400 to 4,000 lpm, even during dry periods.	Same as above.	Same as above.
	James Creek		Same as above.	Generally inaccessible because of dense vegetation; some steep banks locally present.
3	Bones Creek		Suitable for agricultural usage and industrial cooling and processing water.	Generally accessible but primarily through impact area; flood plain subject to rapid flooding.
	Beaver Creek		Same as above.	Generally inaccessible because of dense vegetation.
	Little Cross Creek		Suitable as a source of water for drinking, culinary, or food processing purposes after treatment; suitable for lower quality uses.	Generally inaccessible because of dense vegetation and poor drainage.
	Gibson Creek		Suitable for agricultural usage and industrial cooling and process water.	Same as above.
	Stewarts Creek		Suitable for fishing and fish propagation.	Generally inaccessible because of dense vegetation and poor drainage; much of stream is adjacent to impact area.
	Lake McArthur		Suitable as a source of water for drinking, culinary, or food processing purposes after treatment; suitable for lower quality uses.	Generally accessible, although dense vegetation restricts access toward the southern end of the lake.
	Mott Lake		Same as above.	Dense vegetation limits access to existing roads.
	Boundary Line Lake		Same as above.	Same as above.
	Upper & Lower McKellars Lake	All streams and lakes in this map unit with minimum ranges from 40 to 400 lpm, even during dry periods.	The water of Upper McKellars Lake is suitable for agricultural usage and industrial and process purposes; the water of Lower McKellars Lake is suitable for drinking, culinary, or food processing purposes; also suitable for lower quality uses.	Dense vegetation limits access to existing roads.
	Smith Lake		Suitable for fish propagation and fishing and other usage of lower quality.	Generally accessible; some dense vegetation and cliffs locally, 2m (6 ft high), restrict access.
4	Cross Creek Lake		Suitable for drinking, culinary, or food processing purposes after treatment; also suitable for lower quality uses.	Access is generally good; limited vegetation restricts access in areas.
	Holland Lake		Same as above.	Same as above.
	Wyatt Lake		Same as above.	Same as above.
	Kiest Lake		Same as above.	Access easy.
	McFayden Pond		Suitable for fishing and fish propagation.	Dense vegetation restricts access to most of lake; accessible in limited areas.
	Simmons Field Lake		Same as above.	Generally accessible; high banks present locally.
	Texas Pond		Same as above.	Steep banks and vegetation generally limit access.
	Minor tributaries spaced .5 to 3 km apart		Variable; south-central sector has water that is probably not suitable for drinking; water is probably suitable for drinking after treatment in north-central and western sectors not near impact areas.	Dense vegetation and some steep slopes greatly restrict access.
5	Andrews Church Lake	All streams and lakes in this map unit with minimum ranges from 4 to 40 lpm, even during dry periods.	Suitable for drinking, culinary, or food processing purposes after treatment; also suitable for lower quality uses.	Access is generally good.
	Minor tributaries spaced .5 to 1 km apart		Variable; south-central sector has water that is probably not suitable for drinking; water is probably suitable for drinking after treatment in north-central and western sectors not near impact areas.	Dense vegetation and some steep slopes greatly restrict access.
6	Headwaters of streams spaced generally less than .5 km apart	Streams in this map unit discharge less than 4 lpm; stream beds may be dry much of year although a continuous trickle may be present after heavy rains.	Same as above.	Same as above.

SURFACE WATER (CONT)

ANALYSIS OF SURFACE WATERS										
Water Body	CO ₂ ^a		Hardness ^a		Temperature (°F)		Alkalinity ^d		pH ^e	
	W ^b	C ^c	W ^b	C ^c	W ^b	C ^c	W ^b	C ^c	W ^b	C ^c
Lakes (1975 Data)										
Cross Creek Lake	10	8	17.1	17(-)	76	56	2	2	6.5	6.0
Andrews Church Lake	10	5	34.2	34.2	75	60	3.4	3.3	7.1	6.9
Kiest Lake	10	8	17.1	17(-)	78	54	2	2	6.1	5.8
Simmons Lake	20	26	17.1	17(-)	76	53	1	2	6.0	5.0
Wyatt Lake	10	8	17.1	17(-)	78	52	2	2	6.0	5.0
Holland Lake	5	10	17.1	17.1	72	56	1	1	6.2	5.8
Boundary Line Lake	10	11	17.1	17(-)	72	57	1	2	6.0	6.2
Lower McKellars Lake	10	10	17.1	17.1	74	54	1	-	6.0	5.8
McKiethan Lake	10	-	17	-	78	56	2	-	5.3	-
Mott Lake	12	10	17	-	77	57	2	2	5.3	5.3
Smith Lake	5	-	17.1	-	75	55	2	-	6.0	-
Texas Pond	10	-	17	-	76	57	1	-	5.5	-
Hutaff Lake	10	15	17.1	17.1	73	54	1	-	5.8	6.2
McFayden Pond	5	15	34.2	34.2	74	58	1	-	8.0	7.0
McArthur Lake	15	-	17.1	-	76	56	2	-	5	-
Streams (1977 Data)										
Rockfish Creek	-	5	-	18	-	-	-	1	-	4.9
Puppy Creek	-	0	-	18	-	-	-	0	-	4.9
Gibson Creek	-	2	-	18	-	-	-	0	-	4.9
Juniper Creek	-	3	-	10	-	-	-	1	-	4.9
Explanation of Superscripts:										
a - Measured in parts per million.										
b - Entries in these columns represent averages obtained from April through October.										
c - Entries in these columns represent averages obtained from November through March.										
d - Expressed in grains of calcium carbonate per gallon.										
e - The pH of some lakes is maintained near 7.0 by the addition of calcium carbonate.										

2. GROUND WATER

Ground water sources supply only minimal amounts of fresh water to Fort Bragg. Most developed wells are within the cantonment area where they supplement the pipeline system of the reservation. Some wells are in distant training areas which cannot be connected with the pipeline system of the reservation. Yields of existing wells do not exceed 404 lpm (107 gpm). Springs are absent.

The complex local lithologic variations with depth over much of the reservation, chiefly in the eastern sector, make predicting the probable yields of new wells difficult. Only experimental drilling can confirm the location of satisfactory water-bearing strata. The area with the best potential for new wells with high yields is the southwestern portion of the reservation.

MAP UNIT	QUANTITY AND SOURCE	DEPTH	QUALITY	DEVELOPEMENT OF SOURCES
1	Available quantities are generally proportional to the thickness of sands in the formation. In the eastern portion of the reservation, where thin layers of sand are interbedded with clays and silts, yields range from 189 to 404 lpm (50 to 107 gpm). In the southwestern portion of the reservation, where the sands thicken significantly and clays and silts are substantially reduced, yields may approach 3000 lpm (793 gpm). Assuming hydraulic continuity between the sands of southwestern Fort Bragg and the sands penetrated at McCain, the table of producing wells at McCain (see below) probably provides a reasonable guide to yields which can be expected from Tuscaloosa sands on the southwestern portion of the reservation. Seasonal variation of yields in the wells of Fort Bragg has not been observed.	The depth of wells drilled on the eastern portion of Fort Bragg does not seem to influence the magnitude of expected yields because water-bearing sands of variable thickness, depth, and frequency of occurrence are interbedded with non-water-bearing deposits. The table below shows yields obtained primarily from wells in the eastern portion of the reservation. Toward the southwest, however, evidence suggests that in some cases increasing the depth of wells may increase yields (see tables for wells at McCain and Raeford for an indication of the variation of yields with depth near the southern and southwestern boundary of the reservation.)	The water is of good chemical quality, soft, and with a tendency toward acidity (see table of water quality).	Wells should be screened and packed with gravel to increase yields.
2	Restricted to pockets of sand and gravel within some flood plains; available quantities depend upon the grain size of sediments, degree of sorting, and proximity to the stream. Poorly sorted sands with some clay should yield small quantities. Well sorted, clean sands and gravels, which are rare in the area, should yield moderate to large quantities. Probable locations of sand and gravel deposits are abandoned stream channels and point bars along the Little River and possibly other large streams on the reservation. A dense, thick layer of sandy clay seals the bottom of the Little River, precluding the use of infiltration galleries, but may act as a ground water dam in some areas to trap water in abandoned channels of the stream or within pockets of coarse-grained materials. Seasonal variation in yield should be most significant along smaller streams during low water.	Shallow water tables in the vicinity of streams should result in maximum yields occurring within depths of less than 15m (50 ft).	Wells should be cased to avoid surface contamination. The water is acidic and soft.	The screening of fines is required. Access to many potential well sites is restricted by poor surface drainage, organic soils, and undergrowth. Along the Little River, steep slopes bordering the flood plain allow access to the flood plain only through existing roads.

CHARACTERISTICS OF SELECTED WELLS AT FT. BRAGG											
Well No.	Location	Well Diameter cm/in	Well Depth m/ft	Depth to Water m/ft	Yield lpm/gpm	Well No.	Location	Well Diameter cm/in	Well Depth m/ft	Depth to Water m/ft	Yield lpm/gpm
1	Ranger Station #1	15.2/6.0	33.5/110	18.3/60	189/50	10	Smith Lake Bath House	15.2/6.0	97.5/320	25.6/84	205/55
2	Ranger Station #2	15.2/6.0	20.0/65.5	12.8/42	227/60	11	Relay Station intersection of Plank & Mott Lake Rds.				189/50
3	Ranger Station #3	15.2/6.0	27.6/90.5	16.9/55.5	227/60	12	Officers' Club Golf Course	15.2/6.0	27.2/89.2	12.6/41.4	284/75
4	Ranger Station HQ	15.2/6.0	103/337	25.9/85		13	Officers' Club Golf Course	15.2/6.0	25.8/84.5	11.8/38.8	397/105
5	Aberdeen radar site near King Rd.				227/60	14	Officers' Club Golf Course	15.2/6.0	19.2/63.0	3.5/11.5	404/107
6	Sensor Test Area North of Manchester Rd. on Long-street Rd.	10.2/4.0	21.4/70		68.1/18	15	Officers' Club Golf Course	15.2/6.0	24.9/81.6	5.3/17.3	404/107
7	Recondo Camp on Manchester Rd.	15.2/6.0	29.3/96		106/28	16	Officers' Club Golf Course	15.2/6.0	23.8/78.0	8.8/28.8	246/65
8	Ammunition Dump	19.3/8.0	18.9/62		114/30	17	Stryker Golf Course	15.2/6.0	50/164	7.2/23.5	643/170
9	Ammunition Dump	10.2/4.0	21.9/72		19/5	18	Stryker Golf Course	15.2/6.0	46.3/152	10.6/34.9	272/72

CHEMICAL ANALYSIS OF GROUND WATER IN THE FORT BRAGG AREA
IN MILLIGRAMS PER LITER EXCEPT WHERE INDICATEDD OTHERWISE

Well Number:	1a	2b	3a	4a	5b	6b	7b	10b	11a
A. Operational Management:									
1. alkalinity (as CaCO3)	2.020	.000	2.02	1.01	.080	30.30	2.40	46.46	1.01
2. pH (pH units)	5.90	5.150	6.00	c	5.990	7.30	6.56	7.70	c
3. hardness (total to CaCO3)	4.04	6.100	2.02	4.04	2.030	40.40	3.26	287.10	6.06
4. specific conductance (mmhos)	13.57	40.000	15.46	40.80	13.000	124.44	16.00	740.00	29.58
5. calcium	<1.00	.710	<1.00	<1.00	1.000	15.60	<1.00	110.00	<1.00
6. potassium	<.50	3.710	<.50	<.50	.500	<.50	<.50	1.30	c
7. silica	c	<1.000	c	c	4.090	c	16.00	1.00	<.50
8. solids, total dissolved	.00	28.800	12.00	18.00	16.000	82.20	5.20	598.00	28.00
9. Langelier Index	-5.281	-4.605	-5.215	d	-5.633	-1.602	-4.568	-.322	d
B. Aesthetic Acceptability:									
1. boron	c	.0300	c	c	c	c	c	c	c
2. copper	.465	.1660	.031	.0390	.0250	<.0250	.030	<.0250	<.0250
3. iron	.381	.6090	<.050	.3570	.1000	.3380	.104	.1240	.1680
4. magnesium	<.500	.0300	<.500	<.5000	.5000	<.5000	<.500	.7000	<.5000
5. manganese	<.030	<.5000	<.030	<.0300	.0300	<.3000	<.030	.1480	<.0300
6. zinc	.515	.3090	.059	.2670	.1500	.0730	<.545	.1660	.7490
C. Indicator Anion:									
1. chlorides	1.75	2.84	3.0	2.000	1.520	4.50	2.64	8.250	1.750
2. sulfates	2.00	5.76	2.0	2.000	5.560	2.50	5.41	190.000	2.500
D. Medical Acceptability									
1. arsenic	<.0100	<.0100	<.0100	<.0100	<.0100	<.0100	<.0100	<.0100	.0100
2. barium	<.3000	<.5000	<.3000	<.3000	<.5000	<.3000	<.5000	<.3000	<.3000
3. cadmium	.0050	<.0050	<.0050	<.0050	<.0050	<.0050	<.0050	<.0050	<.0050
4. chromium	<.0250	<.0250	<.0250	<.0250	<.0250	<.0250	<.0250	<.0250	<.0250
5. fluorides	<.0100	<.1000	<.0100	<.0100	<.1000	<.0100	<.1000	.9400	<.0100
6. lead	.0100	.0240	<.0050	<.0050	<.0050	<.0050	<.0050	<.0050	<.0050
7. mercury	<.0002	<.0002	<.0002	<.0005	<.0005	<.0002	<.0002	<.0002	<.0002
8. nitrates, as nitrogen	<.1300	.0100	.2300	2.0800	.4330	3.8000	.0002	.0100	1.0300
9. silver	<.0250	.0250	<.0250	.0250	.0250	.0250	.9000	.0250	.0250
10. sodium	<1.0000	3.1000	<1.0000	1.0000	1.2000	4.9000	.0250	28.2000	1.0000
E. Total Organo Phosphates									
1. Gross Alpha (pc/l)	1.0000	4.80000	2.70000	.9000	.90000	1.00000	5.400	.0600	1.30000
2. Gross Beta (pc/l)	1.0000	6.50000	1.20000	1.4000	1.20000	3.30000	1.200	.0700	2.50000
3. Tritium (Micro Curie)	.0011	.00080	.00092	.0011	.0007	.00095	.001	.1000	.00093

EXPLANATION OF NOTES
a: Water analysis by U.S. Army Environmental Hygiene Agency, Regional Division, Fort McPherson, Georgia, February 1975.
b: Water analysis by U.S. Army Environmental Hygiene Agency, Regional Division, Fort Meade, Maryland, January 1976.
c: not analyzed.
d: not calculated.

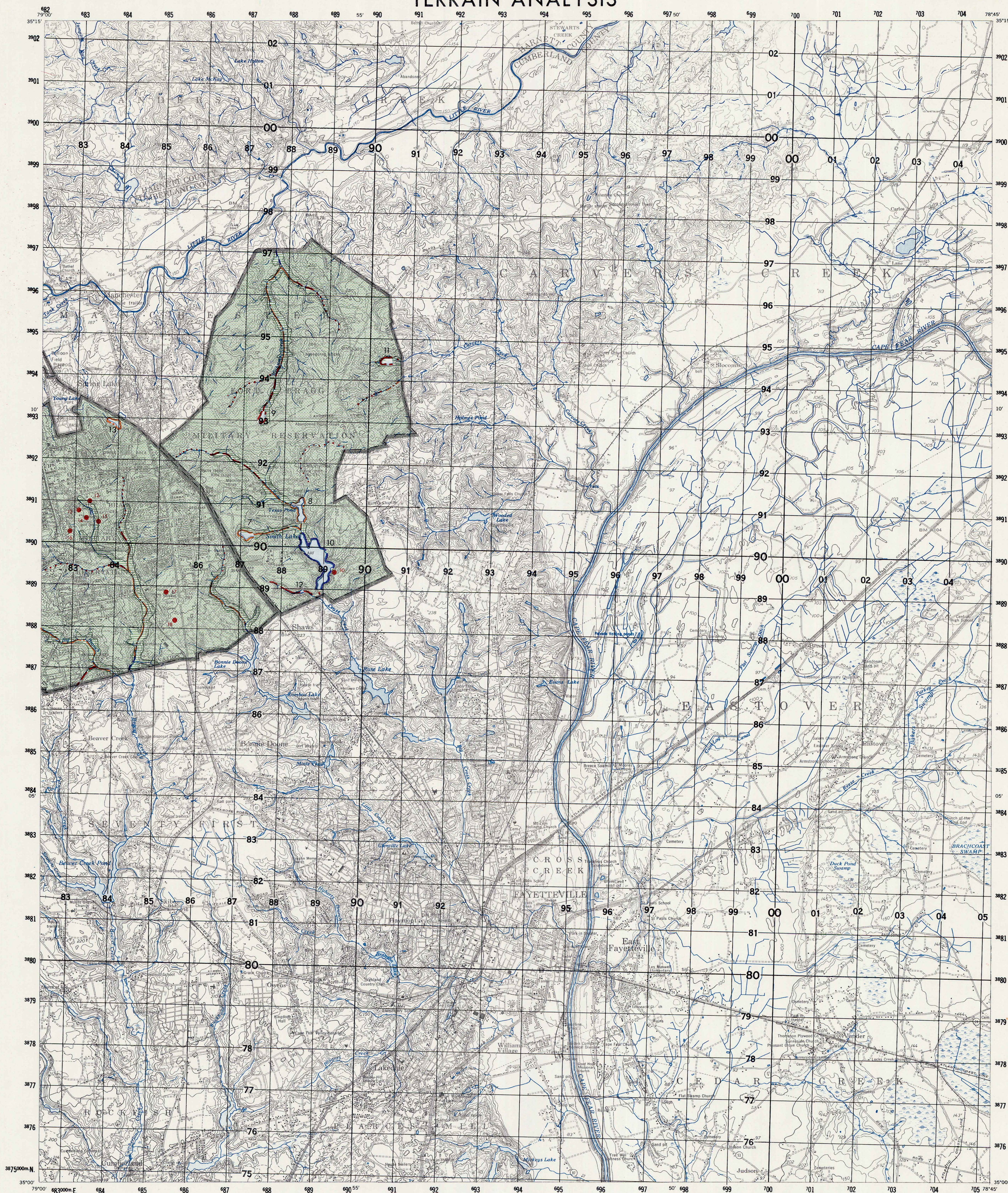
RECORDS OF SELECTED WELLS IN HOKE COUNTY NEAR FORT BRAGG *

WELL NO	LOCATION	OWNER	TYPE OF WELL	DEPTH m/ft	DIAMETER cm/in	DEPTH OF CASING m/ft	CHIEF AQUIFER	YIELD lpm/gpm
2	McCain	NC Tubercu- losis Sanator- ium	Screen	76.4/254	20.3/8	NO DATA	Tuscaloosa sand	378/100
3	do	do	Gravel-walled	86.5/284	20.3/8	NO DATA	do	378/100
4	do	do	Screen	76.2/250	20.3/8	76.2/250	do	756/200
5	do	do	Gravel-walled	94.2/309	60.9/24	NO DATA	do	189/50
6	do	do	Open-end	35.0/115	NO DATA	NO DATA	do	453/120
7	do	do	Gravel-walled	122/401	25.4/10	NO DATA	do	1701/450
8	do	do	do	86.9/285	25.4/10	NO DATA	do	3402/900
9	do	do	do	84.7/278	25.4/10	NO DATA	do	1920/508
10	do	W.H. Callo- way	Screen	21.3/70	15.2/6	20.7/68	do	37.8/10
11	do	do	do	22.5/74	10.2/4	21.9/72	do	30.2/8
12	7 miles NE of Raeford	Newton Ser- vice Station	do	28.3/93	10.2/4	27.7/91	Tuscaloosa clay	37.8/10
13	5 miles NE of Raeford	G.W. Ray	do	22.2/72	10.2/4	20.7/68	do	37.8/10
14	7 miles NE of Raeford	Marshall Newton	do	27.1/89	10.2/4	35.9/85	do	56.7/15
15	3 miles NW of Raeford	J.O. Veezey	Open-end	33.5/110	10.2/4	24.4/.80	Tuscaloosa sand	37.8/10
16	2 miles NW of Raeford	J.L. Wood	Screen	34.7/114	10.2/4	34.1/112	do	30.2/8
17	Raeford	Town of Rae- ford	do	29.0/95	10.2/4	NO DATA	do	378/100
18	do	do	do	29.0/95	10.2/4	NO DATA	do	378/100
19	do	do	Gravel-walled	70.8/262	15.4/6	NO DATA	do	1134/300

RECORDS OF SELECTED WELLS IN HARNETT COUNTY NEAR FORT BRAGG *

WELL NO	LOCATION	OWNER	TYPE OF WELL	DEPTH m/ft	DIAMETER cm/in	DEPTH OF CASING m/ft	CHIEF AQUIFER	YIELD lpm/gpm
38	4 miles SE of Spout Springs	Overhills farms	Open-end	71.7/235	20.3/8	NO DATA	Volcanic Slate Series	189/50
39	do	do	do	51.8/170	20.3/8	NO DATA	do	189/50
40	9 miles E of Spout Springs	Harnett Lumber Co	do	77.7/255	20.3/8	NO DATA	do	378/100
41	4 miles W of Bunnlevel	C.W. Matthews	do	61.6/202	10.2/4	NO DATA	do	7.56/2
50	5 miles SW of Dunn	H.C. Magruder	do	65.9/216	75.3/6	63.1/207	do	7.56/2

*Adapted from Geology and Ground-water Resources of the Fayetteville Area (1961)



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Scale 1:50,000

1 1/2 0 2 3 Statute Miles
1000 500 0 1000 2000 3000 4000 Meters

Contour Interval 10 Feet

WATER RESOURCES

SURFACE WATER

Fresh Water Perennially Plentiful

1. Enormous quantities available from Little River year round.
2. Very large quantities available from a few large streams during low water; quantities increased during high-water period.
3. Large quantities available at low water from reaches of streams and lakes spaced 2-5 km apart; quantities increased during high-water period.

Fresh Water Seasonally Plentiful

4. Moderate quantities available at low water from minor tributaries and lakes spaced 5-3 km apart; large to very large quantities available during high-water period.

Fresh Water Scarce

5. Small quantities available at low water from minor tributaries and lakes spaced .5-1 km apart; moderate quantities available during high-water period. Only representative streams mapped.
6. Meager quantities available during dry season from headwaters of streams spaced generally less than .5 km apart; stream beds frequently dry but may be moist; continuous trickle may be present during high-water period. Only representative streams mapped.

NOTES:

1. Numbered lakes refer to entry in table.
2. Lakes not outlined are not classified.

GROUND WATER

Fresh Water Locally Plentiful

1. Small to large quantities available from alluvium.
2. Small to moderate quantities available from interbedded sands, silts, and clays.

20

Well location (number refers to entry in table)

Definitions of underlined terms are as follows:

Volume Terms	Liters per minute (lpm)	Gallons per day (gpd)
Enormous	More than 40,000	More than 15,000,000
Very Large	4,000-40,000	1,500,000-15,000,000
Large	400-4,000	150,000-1,500,000
Moderate	40-400	15,000-150,000
Small	4-40	1,500-15,000
Meager	Less than 4	Less than 1,500

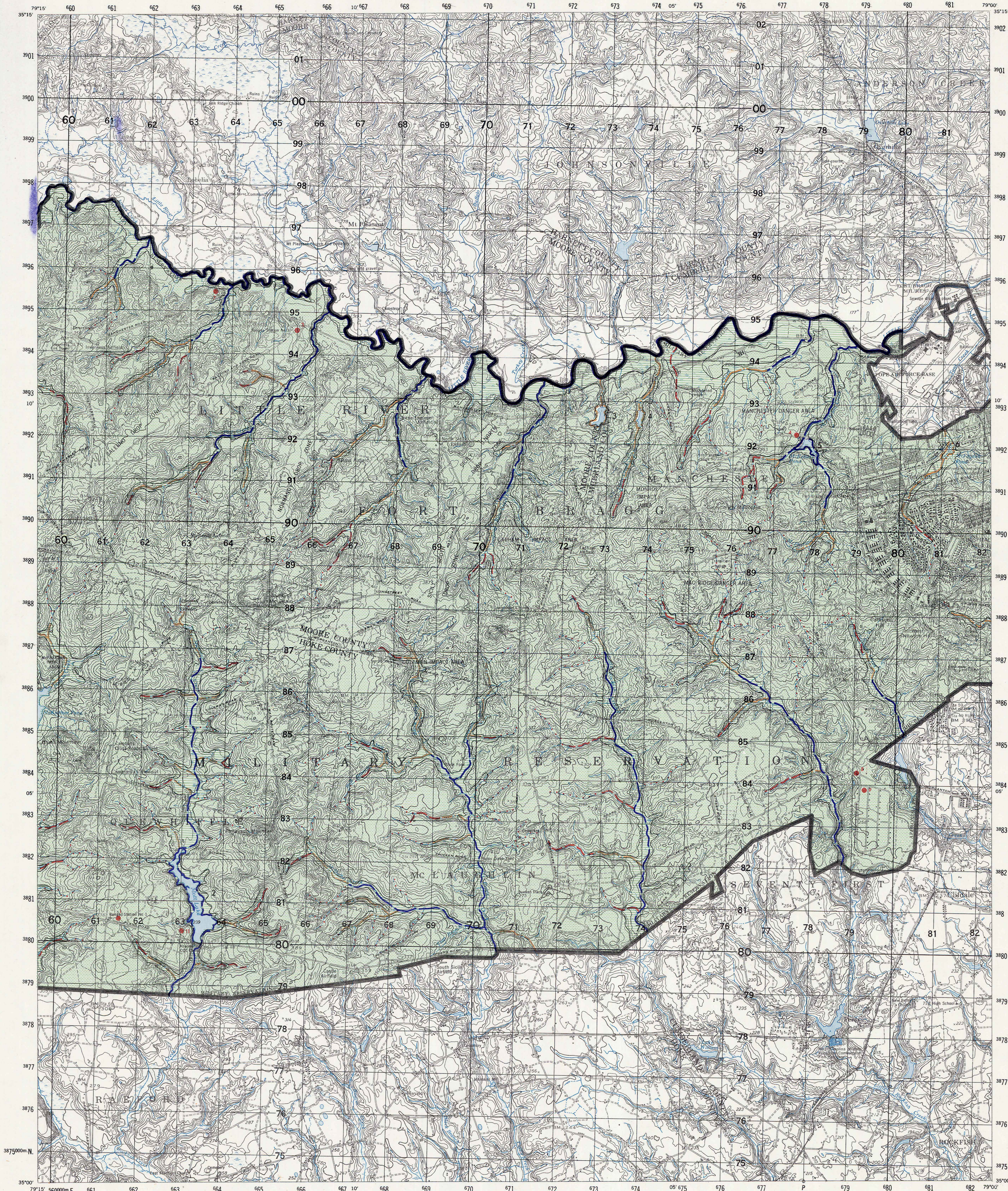
NOTE: Definitions of underlined terms apply to Surface Water and Ground Water.

USER'S NOTE: For permissible concentrations of impurities in military water supplies, see Field Water Supply, TM 5-700, July 1967, paragraph 19, or other applicable manuals or regulations.

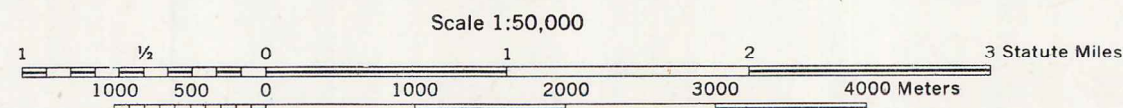
INDEX TO ADJOINING SHEETS

5254 I	5254 IV	5254 I
5254 II	5254 III	5254 II
5254 I	5254 IV	5254 I

Sheet 5254 III falls within NI 17-3, V601, 1:50,000

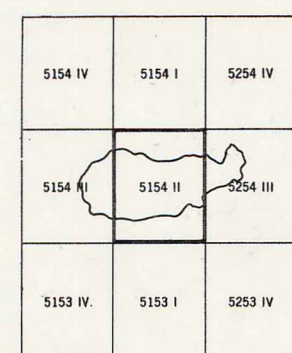


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Prepared by the 283D Engineer Detachment (Terrain) under the direction of the Terrain Analysis Center, US Army Engineer Topographic Laboratories Ft. Belvoir, Virginia, 22060.

ADJOINING SHEETS



Sheet 5154 II falls within NI 17-3, V901 1:50,000

WATER RESOURCES

SURFACE WATER

Fresh Water Perennially Plentiful

1. Enormous quantities, available from Little River year round.
2. Vary large quantities available from a few large streams during low water; quantities increased during high-water period.
3. Large quantities available at low water from reaches of streams and lakes spaced 2-5 km apart; quantities increased during high-water period.

NOTES:

1. Numbered lakes refer to entry in table.
2. Lakes not outlined are not classified.

Fresh Water Seasonally Plentiful

4. Moderate quantities available at low water from minor tributaries and lakes spaced 5-3 km apart; large to very large quantities available during high-water period.
5. Small quantities available at low water from minor tributaries and lakes spaced 5-1 km apart; moderate quantities available during high-water period. Only representative streams mapped.
6. Meager quantities available during dry season from headwaters of streams spaced generally less than 5 km apart; stream beds frequently dry but may be moist; continuous trickle may be present during high-water period. Only representative streams mapped.

Fresh Water Scarce

GROUND WATER

Fresh Water Locally Plentiful

1. Small to large quantities available from alluvium.
2. Small to moderate quantities available from interbedded sands, silts, and clays.

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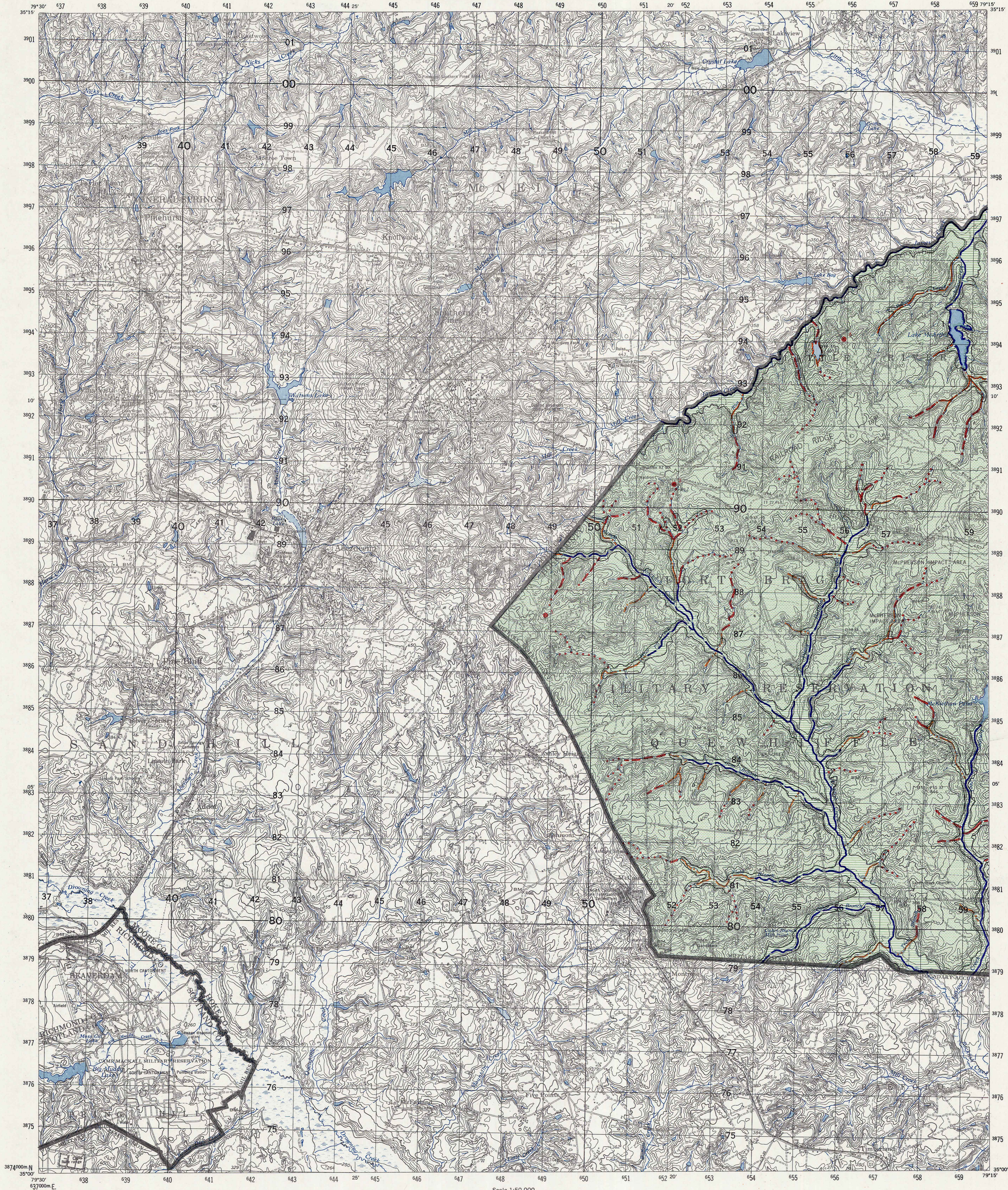
Well location (number refers to entry in table)

Definitions of underlined terms are as follows:

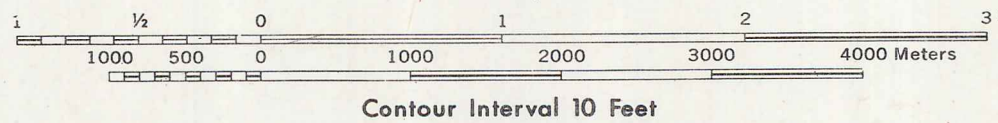
Volume Terms	Liters per minute (lpm)	Gallons per day (gpd)
Enormous	More than 40,000	More than 15,000,000
Very Large	4,000-40,000	1,500,000-15,000,000
Large	400-4,000	150,000-1,500,000
Moderate	40-400	15,000-150,000
Small	4-40	1,500-15,000
Meager	Less than 4	Less than 1,500

NOTE: Definitions of underlined terms apply to Surface Water and Ground Water.

USER'S NOTE: For permissible concentrations of impurities in military water supplies, see Field Water Supply, TM 5-700, July 1967, paragraph 19, or other applicable manuals or regulations.



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Prepared by the 283D Engineer Detachment (Terrain) under the direction of the Terrain Analysis Center, US Army Engineer Topographic Laboratories Ft. Belvoir, Virginia, 22060.

INDEX TO ADJOINING SHEETS

5054 I	5154 IV	5154 I
5054 II	5154 V	5154 II
5054 III	5154 VI	5154 III

Sheet 5154 III falls within NT 17-3, V501, 1:250,000

WATER RESOURCES

SURFACE WATER

Fresh Water Perennially Plentiful

1. Enormous quantities available from Little River year round.
2. Very large quantities available from a few large streams during low water; quantities increased during high-water period.
3. Large quantities available at low water from reaches of streams and lakes spaced 2-5 km apart; quantities increased during high-water period.

NOTES:

1. Numbered lakes refer to entry in table.
2. Lakes not outlined are not classified.

Fresh Water Seasonally Plentiful

4. Moderate quantities available at low water from minor tributaries and lakes spaced 3-3 km apart; large to very large quantities available during high-water period.
5. Small quantities available at low water from minor tributaries and lakes spaced 3-1 km apart; moderate quantities available during high-water period. Only representative streams mapped.
6. Meager quantities available during dry season from headwaters of streams spaced generally less than 3 km apart; stream beds frequently dry but may be moist; continuous trickle may be present during high-water period. Only representative streams mapped.

Fresh Water Scarce

GROUND WATER

Fresh Water Locally Plentiful

1. Small to large quantities available from alluvium.
2. Small to moderate quantities available from interbedded sands, silts, and clays.

20

Well location (number refers to entry in table)

Definitions of underlined terms are as follows:

Volume Terms	Liters per minute (lpm)	Gallons per day (gpd)
Enormous	More than 40,000	More than 15,000,000
Very Large	4,000-40,000	1,500,000-15,000,000
Large	400-4,000	150,000-1,500,000
Moderate	40-400	15,000-150,000
Small	4-40	1,500-15,000
Meager	Less than 4	Less than 1,500

NOTE: Definitions of underlined terms apply to Surface Water and Ground Water.

USER'S NOTE: For permissible concentrations of impurities in military water supplies, see Field Water Supply, TM 5-700, July 1967, paragraph 19, or other applicable manuals or regulations.

D. ENGINEERING SOILS

This table and accompanying engineering soils map indicate the general distribution and characteristics of major soil types on Fort Bragg. The evaluations are merely guides for developing broad-based plans and are not intended to supplant detailed, on-site investigations.

The soil profiles diagrammed herein represent the generalized conditions which are present in the upper few meters of soil. However field samples may vary considerably from the generalized profiles in response to local conditions. The diagrams of soil profiles have been left open at the bottom to indicate that, almost everywhere on post, soils extend several meters in depth before reaching the parent material which consists of coastal plains sediments. Because the parent material is generally easily excavated (the sediments are primarily interbedded sands, clayey sands and clays) a demarcation between the surface soils and parent material can not readily be established.

The total depth of the surficial soils together with the unconsolidated parent material commonly extends to basement rock 100 to 200 feet below the surface. Toward the western sector of the reservation the generally loose soil and parent material are interrupted by a resistant bed of arkosic sandstone up to 6 meters (20 feet) thick which occurs at depths generally less than 15 meters (50 feet). See the Geology section of this study for further information.

The surface of Fort Bragg is predominatly mantled be sandy soils whose composition ranges from loose sands (Unit 1) to silty and clayey sands in some subsoils (Unit 2). Most soils are well drained or even excessively well drained. Any difficulty in movement across soil of this type would result from dry rather than wet conditions. Poorly drained soils are primarily limited to floodplain and some terrace deposits which are silty sands of usually high organic content.

SOIL CHARACTERISTICS AND SELECTED EVALUATIONS

MAP UNIT	LANDFORMS & SLOPES	TYPICAL SOIL PROFILE-LAYERS, THICKNESS OF LAYERS AND UNIFIED ENGINEERING CLASSIFICATION 1/ (PROFILES NOT TO SCALE)		HIGH WATER TABLE (DEPTH) AND DURATION	PERMEABILITY cm/hr. (in/hr.)	SHRINK-SWELL POTENTIAL	SEWAGE LAGOONS	SANITARY LANDFILLS	FOUNDATIONS FOR SMALL BUILDINGS	ROAD LOCATION	SHALLOW EXCAVATIONS	TRAFFICABILITY	REMARKS
1	Well to excessively well drained soils covering broad, gently undulating ridges on inter-stream divides. Slopes range from 0 to 10 percent; most between 2 and 5 percent.	m. 0		None (below 2in. through-out year).	15 to 50cm (6 to 20in) in upper 1 to 2m. 5 to 15cm (2 to 6in) below 1 to 2m.	Low to very low	Severe (s)	Slight	Slight	Slight	Severe (c)	Slight to moderate (k) for 4-wheel drive vehicles or tracks; in non-vegetated areas severe (k) for foot troops.	Major soil series included in this map unit are Lakeland, Wakulla and Planton. These soils are easily "fluffed" by traffic, making them very loose.
			SP SM										
		1 2	SM SC										
2	Well-drained soils occurring on moderately sloping uplands and side-slopes above streams. Slopes range from 2 to 12 percent but may include small areas of steeper slopes.	m. 0		None (below 2m. through-out year).	15 to 50cm (6 to 20in) in upper layer. 0.2 to 0.5cm (.1 to .2in) in brittle layer. 5 to 15 (2 to 6 in) below brittle layer.	Low	Moderate (s)	Slight	Slight	Slight	Slight	Slight to moderate (k) for 4-wheel drive vehicles or tracks; slight for foot troops.	Major soil series are the Blaney, Gilead and Vaucluse. The firm, brittle layer is technically called a fragipan. The downward movement of water and plant roots is commonly restricted by the dense, compact fragipan.
			SP SM										
		0.25 1.5	SC SM SC CL										
3	Strongly sloping soils on side slopes of ridges above streams. Most areas dominated by slopes that range from 12 to 25 percent, but may include small areas of short, steeper slopes.	Soil characteristics similar to Map Unit 2.		None (below 2m. through-out year).	Similar to Map Unit 2.	Similar to Map Unit 2	Severe (s)	Slight	Moderate (s)	Moderate (s)	Moderate (s)	Same as above.	Major soil series same as in Map Unit 2. The fragipan tends to be somewhat less developed than in Map Unit 2.
4	Nearly level, generally very poorly drained soils covering flood plains and low terraces along the larger streams. Most slopes less than 2 percent.	m. 0		Less than 45 cm below surface 8 months of year (Nov-June). Often at or near surface.	5 to 15cm (2 to 6in) in upper layer. 15 to 50 (6 to 20in) in lower lenses.	Low	Severe (w)	Severe (w)	Severe (w)	Severe (w)	Severe (w)	Severe (w)	Major soil series is the Johnston. In addition to the high water table, these areas have a high risk of being flooded during periods of heavy rains.
			SM ML										
		0.25 0.5	SM SP										

1/ The Unified Soil Classification System, technical Memorandum N.3-357, US Army Corps of Engineers, March, 1953.
2/ Soils that have profiles almost alike make up a soil series. The series is the common name of the soil. Each series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Many other minor soils are included in the map unit.

Soil Characteristics Affecting Limitations:

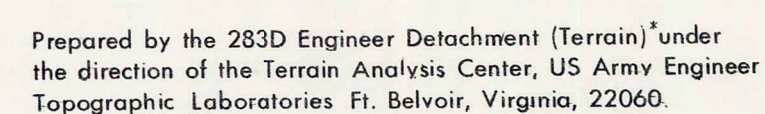
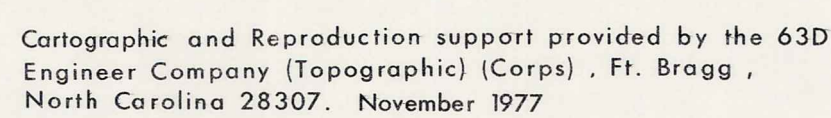
- c - clayey subsoil, poor workability
- k - loose sand
- s - slope
- w - wetness

High Water table (additions):

- (1) 2 meters below surface through year.
- (2) Less than 45 cm from surface 8 months of the year (Nov-June). Often at or near surface.

Definitions of Rating Terms:

- Slight - relatively free of limitations, or limitations are easily overcome.
- Moderate - limitations can be overcome with good planning and/or careful design.
- Severe - limitations are serious and are difficult to overcome.



* In cooperation with the Cumberland-Hoke County Soils Survey Party, USDA Soil Conservation Service, Fayetteville, North Carolina, 28301.

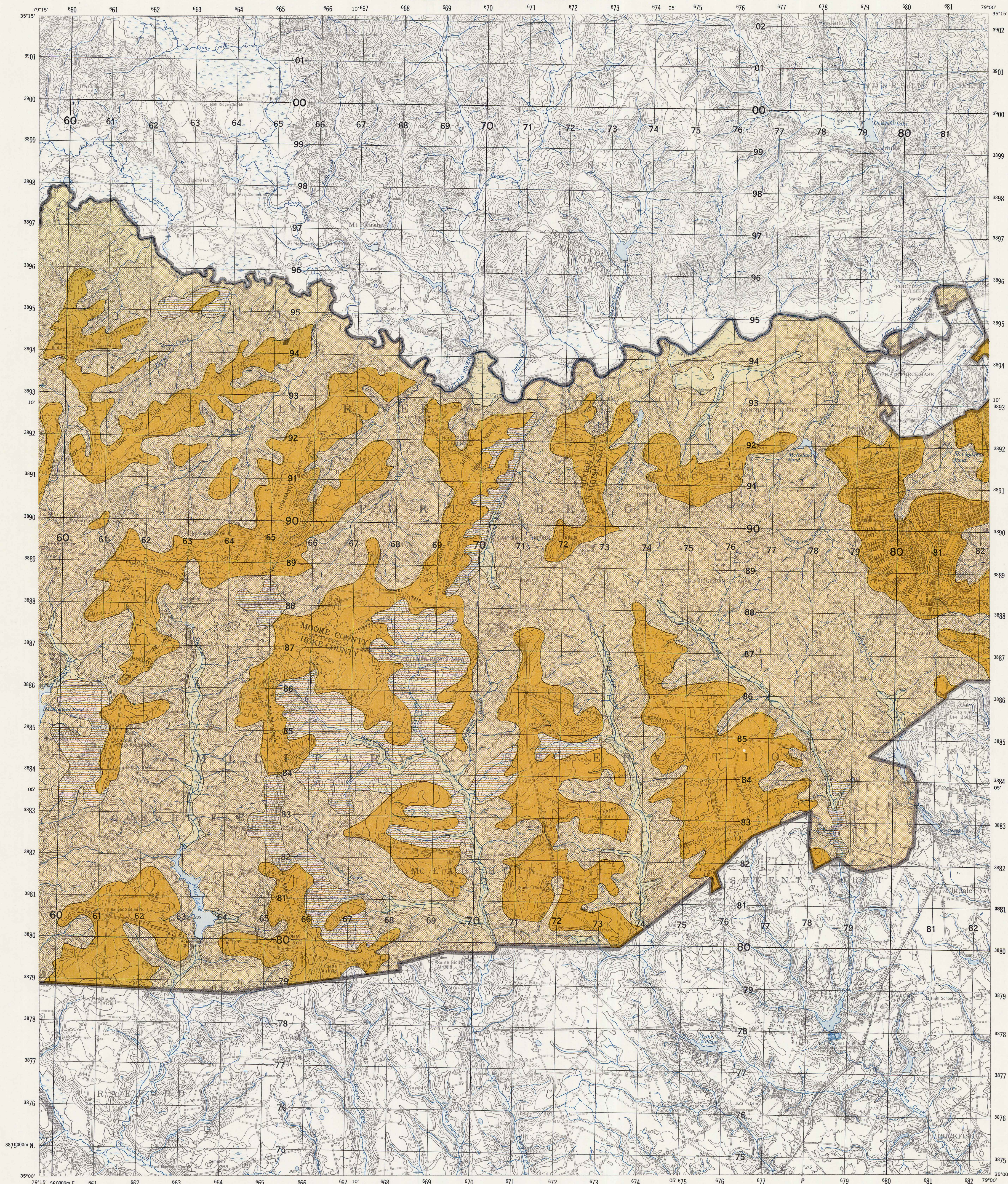
INDEX TO ADJOINING SHEETS		
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5154 II	5254 III	5254 II
5153 I	5253 IV	5253 I

Sheet 5254 III falls within NI 17-3, V501.

1. Very deep, well to excessively well drained, poorly graded sand over clayey sand or silty sand.
2. Very deep, well drained, poorly graded sand or silty sand over deep or silty sand; some iron concentrations near surface; surface slope 0-10%.
3. Very deep, well drained, poorly graded sand or silty sand over deep or silty sand; some iron concentrations near surface; surface slope 11-25%.
4. Very deep and poorly drained floodplain soils consisting of silty sand or silty high in organic matter.

FORT BRAGG , NORTH CAROLINA

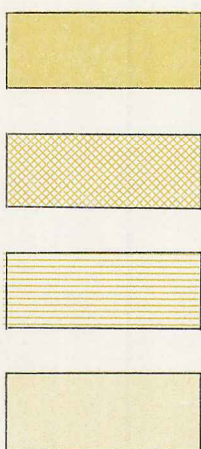
TERRAIN ANALYSIS



Cartographic and reproduction support provided by the 63D Engineer Company (Topographic) (Corps), Ft. Bragg, North Carolina 28307. November 1977

Scale 1:50,000
1 1/2 0 1 2 3 Statute Miles
1000 500 0 1000 2000 3000 4000 Meters

ENGINEERING SOILS

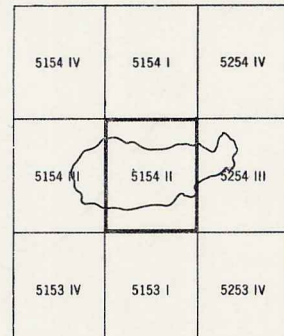


1. Very deep, well to excessively well drained, poorly graded sand over clayey sand or silty sand.
2. Very deep, well drained, poorly graded sand or silty sand over deep or silty sand; some iron concentrations near surface; surface slope 0-10%.
3. Very deep, well drained, poorly graded sand or silty sand over deep or silty sand; some iron concentrations near surface; surface slope 11-25%.
4. Very deep and poorly drained floodplain soils consisting of silty sand or silt high in organic matter.

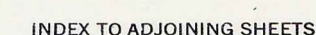
Prepared by the 283D Engineer Detachment (Terrain) under the direction of the Terrain Analysis Center, US Army Engineer Topographic Laboratories Ft. Belvoir, Virginia, 22060.

* In cooperation with the Cumberland-Hoke County Soils Survey Party, USDA Soil Conservation Service, Fayetteville, North Carolina, 28301.

ADJOINING SHEETS



Sheet 5154 II falls within N173, V501, 1:250,000



Sheet 5154 III falls within NI 17-3, V501,
1:250,000

1. Very deep, well to excessively well drained, poorly graded sand over clayey sand or silty sand.
2. Very deep, well drained, poorly graded sand or silty sand over deep or silty sand; some iron concentrations near surface; surface slope 0-10%.
3. Very deep, well drained, poorly graded sand or silty sand over deep or silty sand; some iron concentrations near surface; surface slope 11-25%.
4. Very deep and poorly drained floodplain soils consisting of silty sand or silt high in organic matter.

* In cooperation with the Cumberland-Hoke County Soils Survey Party, USDA Soil Conservation Service, Fayetteville, North Carolina, 28301.

E. ENGINEERING GEOLOGY

Engineering Geology

Few surficial geologic features are evident on Fort Bragg because the dominant, generally unconsolidated, uniform Upper Cretaceous Tuscaloosa Group lithologic unit covers more than 90 percent of the reservation. The Tuscaloosa Group varying in thickness from 61 to 122 meters (200 to 400 feet), is an easily eroded material whose normal surface expression is a series of low, rounded, sandy hillocks with elevations increasing westward. The hillocks in the western part of Fort Bragg, and some in the eastern part, are capped by what apparently is the Castle Hayne ironstone.

The materials of the Tuscaloosa Group generally are suitable only for fill because of locally high amounts of clay. Poor consolidation and generally high proportions of sand make materials poorly resistant to erosion. In localities high in clay content, however, vertical surfaces occur occasionally. The clays affect the drainage and often cause relatively large sidehill seeps. During field work for this study, outcrops of a resistant bed in the Tuscaloosa were mapped (see accompanying map). The bed is very resistant locally; the material should be tested for suitability for construction uses. Characteristics of the bed are discussed below. The only other material of engineering interest is the ironstone caprock mentioned above. The ironstone is relatively resistant to erosion, but is friable and probably not acceptable as a source of construction material.

The Tuscaloosa most frequently appears as a series of beds of tan to reddish brown, loose to fairly well consolidated sandy clays, gravelly sands, and light grey, white, or buff arkosic sands with subordinate beds of silt and clay mottled by pink, purple, or brown. An occasional massive exposure of kaolin appears to be associated with arkosic sands. Kaolin, the principle clay mineral in the Tuscaloosa, suggest formation in a moist, acid environment where drainage was good and leaching could occur. The absence of fossils, however, precludes classifying the Tuscaloosa as marine or continental. Because of its varied composition, the Tuscaloosa, has undergone many changes over the past years as to differentiation and nomenclature of its members and formations. For this study, the stratigraphic interpretation of Drenner (1953), is generally accepted and the group is considered to be composed of the Coker and Gordo Formations.

The Coker Formation consists of apparently non-marine beds 46 to 76 meters (150 to 250 feet) thick. Its varied lithology includes: (1) basal, strongly cross-bedded channel sand, upper part locally finely laminated and containing macerated plant remains; (2) massive carbonaceous and varicolored clay containing nodules of granular siderite; locally, clay occupies channels which, in places, may extend to the base of the formation; (3) interbedded purple and gray mottled clay and highly cross-bedded, fine-grained micaceous yellow sand containing brecciated clay; (4) bentonite bed near base in one area; and (5) local occurrences of chert gravel gravel which resembles gravel of the Gordo Formation. Some authorities have tentatively retained this gravel in the Coker because of the striking, abrupt, and widespread occurrence of gravel in Gordo. Further investigation may indicate that the contact should be redefined to include all of the gravel and coarse sand in the Gordo.

The Gordo Formation is provisionally defined as the interbedded series of non-marine gravels, sands, and clays overlying the Coker Formation. The base of the unit is marked by an abrupt appearance of abundant chert gravel and gravelly sand, the gravel gradually decreasing in abundance upward. The formation consists of two unnamed members: the lower is 40 meters (130 feet) of gravel and sand; the upper consists chiefly of clay and non-gravelly sand 18 to 61 meters (60 to 200 feet) thick.

The Tuscaloosa is not very resistant to erosion and its clayey beds are well exposed only in stream valleys or a few road cuts. The most striking and extensive outcrop is along the Little River near grid coordinates 664956. Here the beds are unusually resistant and have withstood erosion by large quantities of water present during flood stage. The weathered surfaces are characteristically reddish brown, but a fresh surface shows the blueness of the unweathered clay. A tendency to be easily eroded has left the vast majority of the post covered by a yellow to reddish-brown sand. Lithified outcrops are generally absent. Probably the best example of typical consolidated

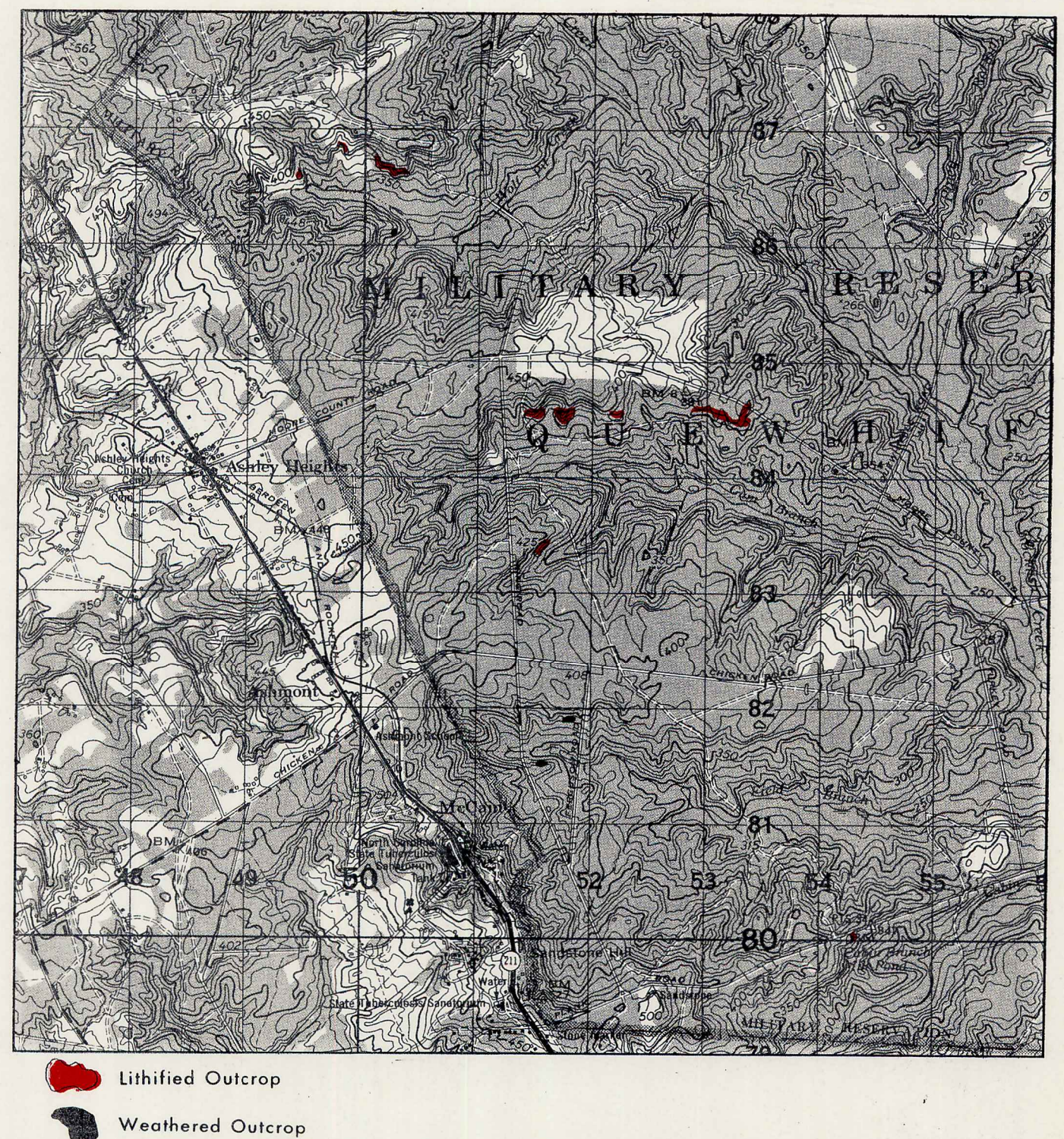
Tuscaloosa Group materials occurs along the northeast shore of Smith Lake at grid coordinates 892897.

There are, however, two other areas of lithified materials on post. In the western part of the post, several outcrops of a resistant arkosic sandy siltstone are evident. They occur almost exclusively between 107 and 122 meters (350 and 400 feet) elevation, strongly indicating a nearly horizontal bed (see accompanying map). The resistance of this bed varies from place to place; this, combined with dense vegetation, makes mapping it extremely difficult. In areas where it is easily eroded, there are no outcrops and its presence is indicated only by a white sandy soil. The outcrops which are evident tend to be extremely tough and resistant to fracture. The bed closely resembles those described as part of the Coker Formation and its resistant nature results in benches of variable heights which are commonly identifiable on topographic maps. The benches are always overlain by quartz-gravel deposits, and by a deposit of extremely dense hematite nodules which appear to be mineral replacement of materials in overlying unit. The gravel is assumed to be the Gordo Formation or upper Coker.

The only other noteworthy outcrops on Fort Bragg are of a dark, resistant ironstone which forms a caprock most apparent on Gaddys and Johnson Mountains in the central part of the reservation. This unit ranges in color from red to dark purple and has been correlated with upper Eocene Castle Hayne deposits which are identifiable and datable at Spout Springs in Harnett County. It has been reported that remnants of the Castle Hayne also cap a few high hills near McCain at the southwestern corner of the reservation.

Outcrops of Resistant Arkosic Sandy Siltstone in the Tuscaloosa Group

(Portion of sheet 5154III scale 1:50,000)



F. Special Physical Phenomena

Fort Bragg experiences occasional earth tremors originating from earthquakes generated by faulting in the vicinity of Charleston, South Carolina. There are no other physical phenomena affecting military operations.

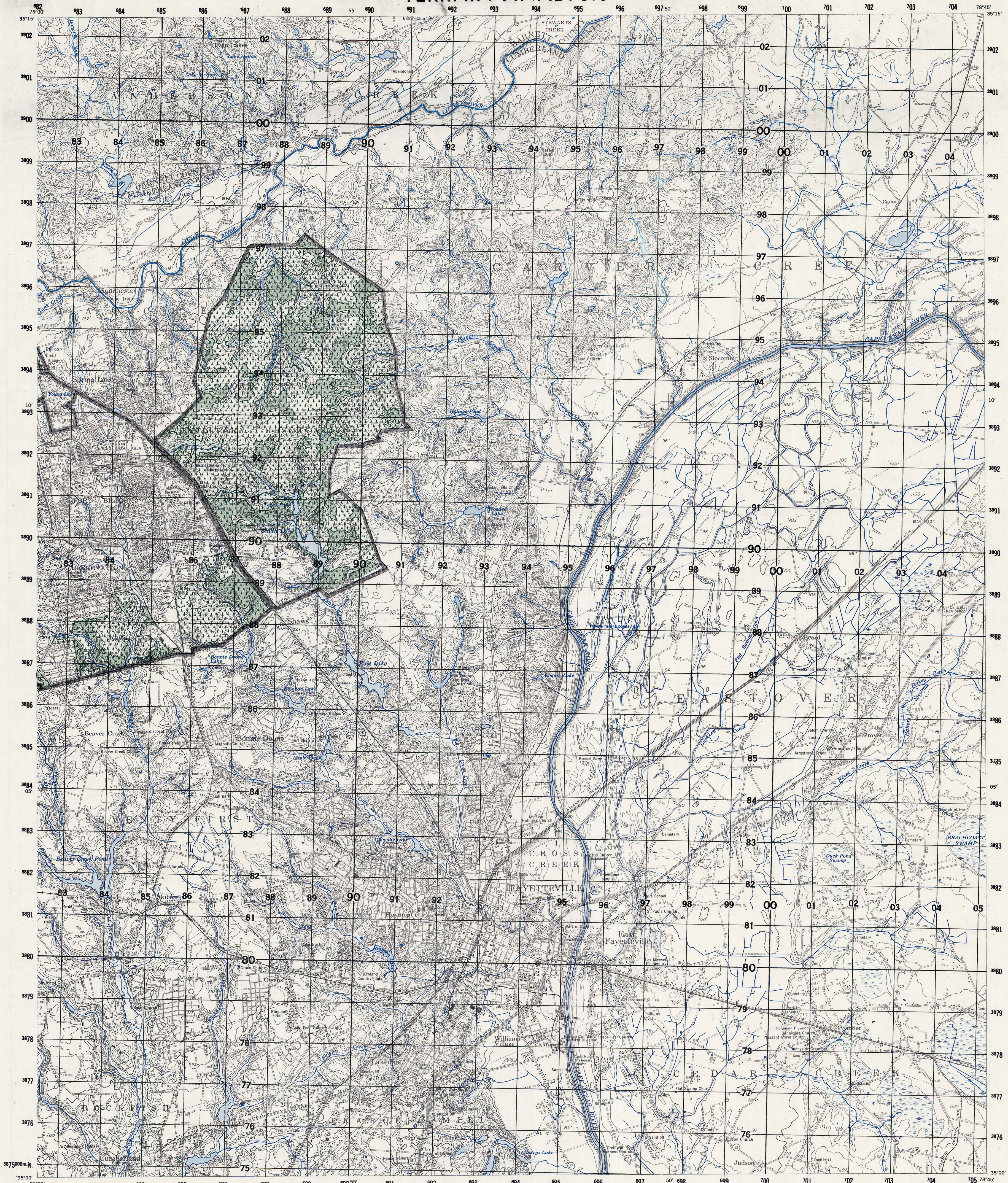
G. VEGETATION

Vegetation on the Fort Dragg Reservation consists largely of pine varieties of trees mixed with scrub oak undergrowth. Pines are on higher slopes and well drained areas. Deciduous trees consisting of upland and lowland hardwoods parallel streams in most areas. Upland hardwoods generally grow on the higher slopes adjacent to stream

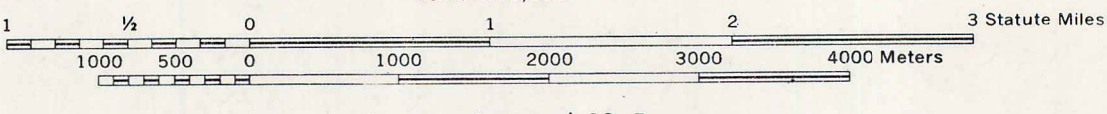
valleys. Scrub oak is found on some firing ranges and is an undergrowth to pine stands. Short grass exists generally in the impact areas but is burned off continually by range fires. Swamps or wet areas are in relatively broad stream valleys.

MAP UNIT	DESCRIPTION	DISTRIBUTION	REMARKS	COVER	CONCEALMENT
1	Coniferous trees, predominantly longleaf pine with some loblolly, pond, and shortleaf pine; about 17m (56ft) average height; trunk diameters from 25 to 32cm (10 to 13in.); 50 to 100% crown cover density; trunks spaced 2 to 5m (6 to 16ft.) apart; branches to ground level on younger, less closely spaced trees; branches to within 2m (6ft.) from ground level in mature, dense stands; medium to dense undergrowth consisting of scrub oak; 75% or more of each stand composed of coniferous species.	Stands throughout the reservation, usually on higher well drained areas, cover approximately 30% of the reservation.	Mature trees harvested in some areas year round; controlled burning is carried out to remove underbrush on a 5 year basis.	Cover from flat-trajectory fire of small arms for foot troops good in dense stands and fair in more widely spaced stands.	Concealment from aerial and ground observation is good year round for foot troops and vehicles.
2	Coniferous trees, predominantly longleaf pine with some loblolly, pond, and shortleaf pine; about 17m (56ft) average height; trunk diameter from 25 to 32cm (10 to 13in.); 10 to 50% crown cover density; trunks spaced 3m (10ft) or more apart; branches to ground level on younger, less closely spaced trees; branches to within 2m (6ft) from ground level in mature, dense stands; relatively open to medium undergrowth; 75% or more of each stand composed of coniferous species.	Stands throughout the reservation, usually on higher well drained areas; cover approximately 25% of the reservation.	Some selective cutting of mature trees.	Cover from flat-trajectory fire of small arms for foot troops fair in dense stands and poor in more widely spaced stands.	Concealment from aerial and ground observation is fair year round for foot troops and vehicles.
3	Deciduous trees; lowland hardwoods which include bald cypress, Atlantic white cedar, blackgum, water oak, willow oak, yellow poplar and red maple; about 22m (72ft) average height; trunks average 15 to 25cm (6 to 10in) in diameter; 50 to 100% crown cover density; trunks spaced 1 to 5m (3 to 16ft) apart; branches to within 3m (10ft) from ground level; leafless period generally November thru March; 75% or more of each stand composed of deciduous species.	Stands parallel streams and tributaries, cover approximately 11% of the reservation.		Cover from flat-trajectory fire of small arms fair for foot troops.	Concealment from aerial and ground observation largely fair for foot troops and vehicles during leafless period, good concealment during leaf periods April through October.
4	Deciduous trees, upland hardwoods including blackjack, turkey, laurel, and swamp red oak; about 17m (56ft) average height; trunks average 15 to 25cm (6 to 10in) in diameter; 10 to 50% crown cover density; trunks spaced 4m (13ft) or more apart; branches to within 3m (10ft) from ground level; leafless period generally November through March; 75% or more of each stand composed of deciduous species.	Stands generally on steeper areas of stream valley, cover approximately 4% of the reservation.		Cover from flat-trajectory fire of small arms poor for foot troops.	Concealment from aerial and ground observation largely poor for foot troops and vehicles; some concealment available when in leaf April through October.
5	Deciduous scrub oak; average height approximately 2m (6ft); trunk diameters average 5cm (2in); crown cover approximately 10%; trunks spaced 5m (16ft) or more apart.	Stands generally around impact areas near ranges, few scattered stands on Nijmegen Drop Zone.	Trees burned off by range fires periodically.	Cover from flat-trajectory fire of small arms is poor for foot troops.	Concealment from aerial and ground observation for foot troops and vehicles is poor year round.
6	Short grass, less than 1m (3ft) high; generally wildlife clearings, for conservation and wildlife food; larger areas on higher slopes; trees not to exceed 10% crown cover density.	Grasslands throughout the reservation usually on higher slopes.	Several areas are seeded on yearly basis.	No cover from flat-trajectory fire of small arms.	Concealment from aerial and ground observation poor year round for foot troops and vehicles.
7	Swamps of closely spaced, predominantly deciduous trees with open water areas along larger streams; lowland hardwoods including bald cypress, Atlantic white cedar, blackgum, water oak, willow oak, yellow poplar and red maple; perennially wet; average height 20m (66ft), trunk diameters 15 to 25cm (6 to 10in) closely spaced.	Primarily on the western end of the reservation; one location near eastern side of Sicily Drop Zone; one stretch between Chicken Road and Plank Road on Little Rockfish Creek.		Cover from flat-trajectory fire of small arms is largely fair for foot troops.	Concealment from aerial and ground observation for foot troops and vehicles is fair from April through October when trees in leaf and poor rest of year.

FORT BRAGG , NORTH CAROLINA
TERRAIN ANALYSIS



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Prepared by the 283D Engineer Detachment (Terrain) under the direction of the Terrain Analysis Center, US Army Engineer Topographic Laboratories Ft. Belvoir, Virginia, 22060.

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5254 II	5254 III	5254 II
5254 I	5254 IV	5254 I

Sheet 5254 III falls within N173, V501, 1:50,000

VEGETATION

FORESTS

- 1. Coniferous trees ; medium to dense spacing.
- 2. Coniferous trees ; nearly open to medium spacing
- 3. Deciduous trees ; medium to dense spacing.
- 4. Deciduous trees ; nearly open to medium spacing.

SCRUB

- 5. Deciduous scrub oak ; generally widely spaced.

GRASSLANDS

- 6. Short grasses

WETLANDS

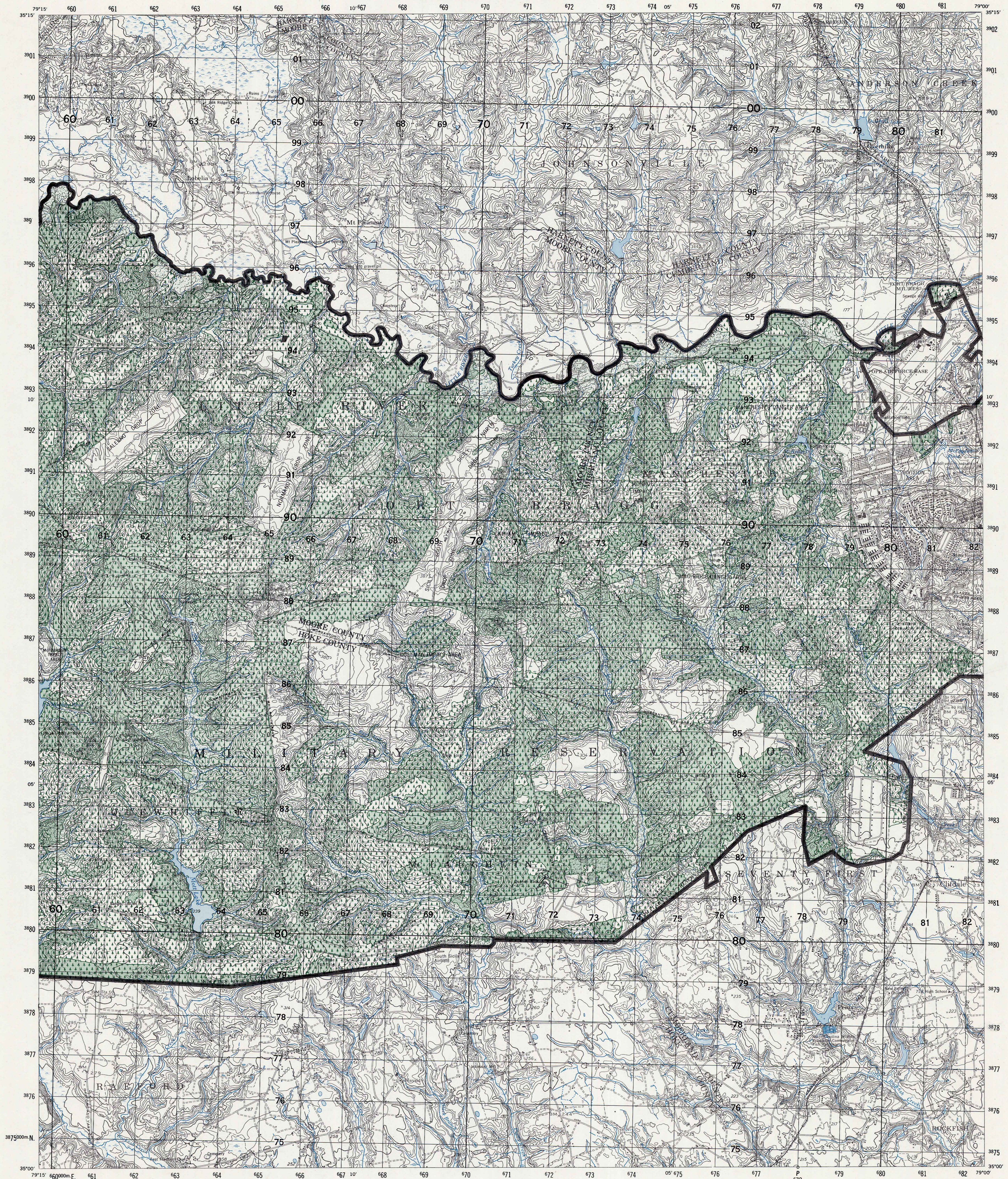
- 7. Swamps ; wet areas with over 50% in trees , brush and shrubs.

OPEN

- 8. Built-up areas ; drop zones ; barren areas ; and heavily used areas.

Vegetation is not a significant factor.

FORT BRAGG , NORTH CAROLINA TERRAIN ANALYSIS

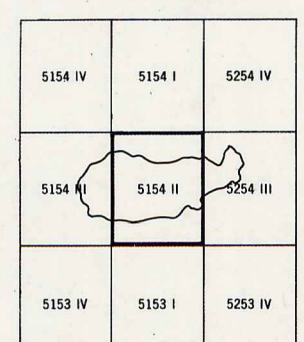


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Scale 1:50,000
1 1/2 0 1 2 3 Statute Miles
1000 500 0 1000 2000 3000 4000 Meters

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ADJOINING SHEETS



Sheet 5154 II falls within NI 17-3, V991, 1:250,000

VEGETATION

FORESTS

1. Coniferous trees ; medium to dense spacing.
2. Coniferous trees ; nearly open to medium spacing.
3. Deciduous trees ; medium to dense spacing.
4. Deciduous trees ; nearly open to medium spacing.

SCRUB

5. Deciduous scrub oak ; generally widely spaced.

GRASSLANDS

6. Short grasses

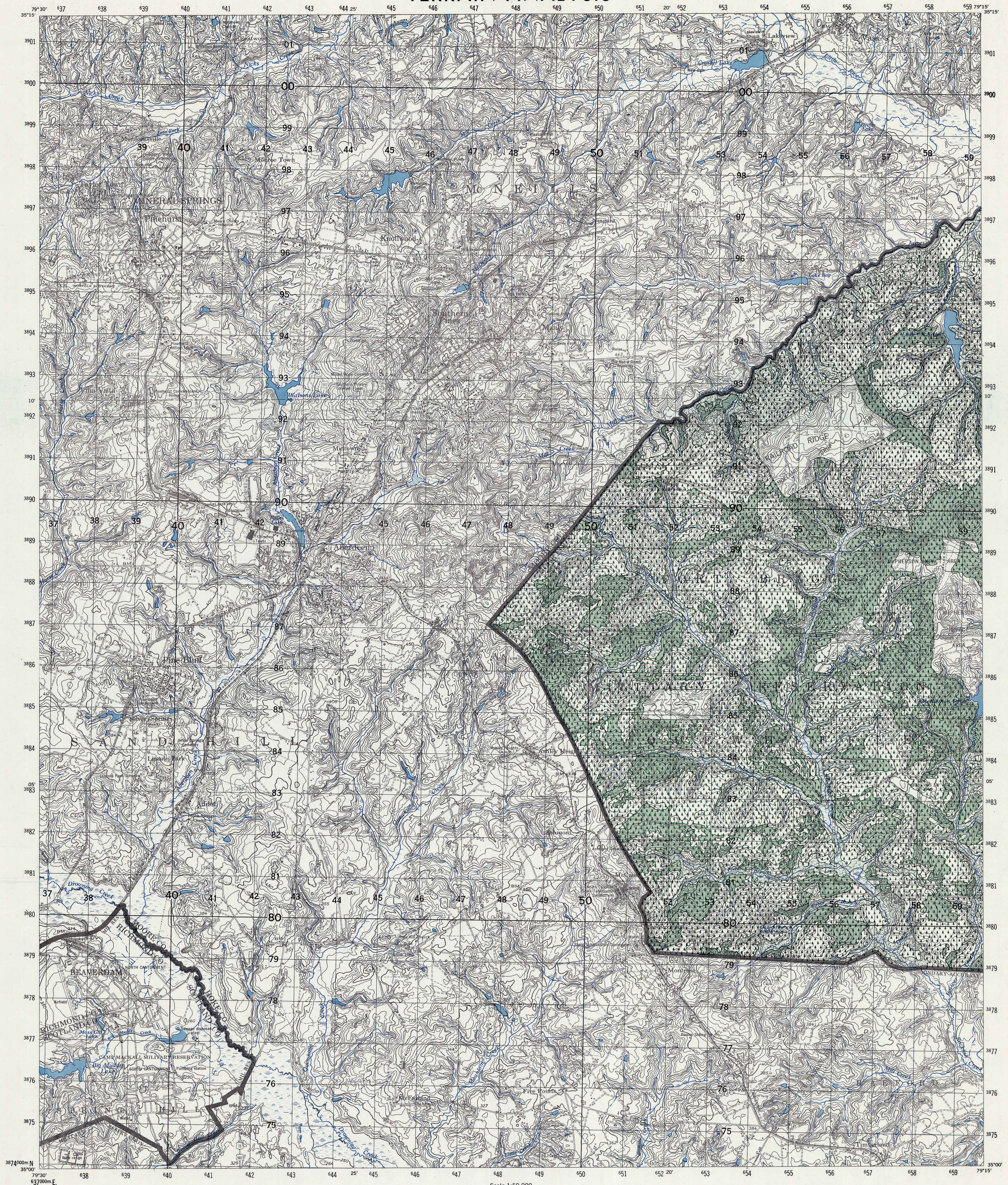
WETLANDS

7. Swamps ; wet areas with over 50% in trees , brush and shrubs.

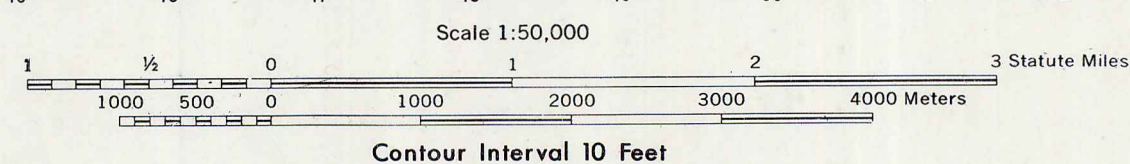
OPEN

8. Built-up areas ; drop zones ; barren areas ; and heavily used areas.
- Vegetation is not a significant factor.

FORT BRAGG, NORTH CAROLINA TERRAIN ANALYSIS



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Engineer Company (Topographic) (Corps), Ft. Bragg,
North Carolina 28307 November, 1977



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the direction of the Terrain Analysis Center, US Army Engineer
Topographic Laboratories Ft. Belvoir, Virginia, 22060.

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5154 II	5154 III	5154 II
5153 I	5153 IV	5153 I

Sheet 5154 III falls within NI 17-3, V501,
1:250,000

VEGETATION

FOREST

- 1. Coniferous trees; medium to dense spacing
- 2. Coniferous trees; nearly open to medium spacing
- 3. Deciduous trees; medium to dense spacing
- 4. Deciduous trees; nearly open to medium spacing

SCRUB

- 5. Deciduous scrub oak; generally widely spaced

GRASSLANDS

- 6. Short grasses

WETLANDS

- 7. Swamps; wet areas with over 50% in trees, brush and shrubs

OPEN

- 8. Built-up areas; drop zones; barren areas; and heavily used areas.
Vegetation is not a significant factor

H. CLIMATE

The climate of Fort Bragg is that of the southeastern United States, humid subtropical with long, hot summers and mild winters. The mean daily minimum temperature in the coldest month, January, is 0°C (32°F), and the mean daily maximum in the hottest month, July, is 31.7°C (89°F). Over a 35 year period of record, the highest temperature recorded at Pope AFB (at the northeast corner of the Fort Bragg Military Reservation) was 41.1°C (106°F) and the lowest was -15°C (5°F). Heating requirements average 3122 degree days per year, and cooling requirements average 1828 degree days per year.

The mean monthly precipitation varies from a low of 71.1 mm (2.8 in) in November to a high of 167.6 mm (6.6 in) in July. The highest absolute maximum monthly precipitation, 401.32 mm (15.8 in), occurred in July, while the lowest absolute minimum monthly precipitation (trace) occurred in September. July, the wettest month, is also the peak month for thunderstorms with an average of 11 days with thunderstorms out of the month. During the thirty-five year period of record, the deepest recorded snow was 14 inches; however, according to newspaper accounts there was a 20 inch snow in 1927.

1. TEMPERATURE

1. TEMPERATURE		CLIMATIC SUMMARY Pope AFB Latitude 35°12'N Longitude 79°01'W Elevation 218 ft (66.4 m)														YEAR OF RECORD
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL		
Absolute Maximum Temperature	(°C) (°F)	26.1 79	28.3 83	32.2 90	35 95	37.2 99	41.1 106	40.6 105	38.9 102	38.9 102	36.1 97	30.6 87	26.1 79	41.1 106	35 35	
Mean Daily Maximum Temperature	(°C) (°F)	11.7 53	13.3 56	17.2 63	23.3 74	27.2 81	30.6 87	31.7 89	23.3 83	28.3 83	23.3 74	17.8 64	12.8 55	22.2 72	35 35	
Mean Daily Minimum Temperature	(°C) (°F)	0 32	1.1 34	4.4 40	9.4 49	14.4 58	18.9 66	21.1 70	20.6 69	16.7 62	10 50	3.9 39	.6 33	10 50	35 35	
Absolute Minimum Temperature	(°C) (°F)	-15 5	-12.2 10	-8.9 16	-3.9 25	-.6 31	5.6 42	12.2 54	8.3 47	3.3 38	-3.9 25	-9.4 15	-13.3 8	-15 5	35 35	
Mean Number Days with Minimum Temperatures Equal to or Greater Than 90°F (32.2°C)		0	0	#	1	4	12	16	14	6	1	0	0	54	35	
Mean Number Days with Minimum Temperatures Equal to or Less Than 32°F (0.0°C)		18	14	8	1	#	0	0	0	0	1	9	18	69	35	
Normal Heating Degree Days (Base 65°F/18.3°C)		710	566	429	154	38	2	0	0	15	153	399	656	3122	29	
Normal Cooling Degree Days (Base 65°F/18.3°C)		1	1	9	74	192	348	463	431	240	60	8	1	1828	29	
Mean Dew Point Temperature	(°C) (°F)	0 32	.6 33	3.3 38	8.3 47	13.9 57	18.3 65	20.6 69	20 68	17.2 63	11.1 52	5 41	.6 33	10 50	35 35	

2. PRECIPITATION

Mean Monthly Precipitation	(mm) (in)	81.3 3.2	94.0 3.7	96.5 3.8	83.8 3.3	83.8 3.3	106.7 4.2	167.6 6.6	139.7 5.5	104.1 4.1	78.7 3.1	71.1 2.8	76.2 3.0	1183.6 46.6	35 35
Absolute Maximum Monthly Precipitation	(mm) (in)	162.6 6.4	172.7 6.8	170.2 6.7	188.0 7.4	203.2 8.0	188.0 7.4	401.3 15.8	332.7 13.1	304.8 12.0	264.2 10.4	254 10.0	205.7 8.1	401.32 15.8	35 35
Absolute Minimum Monthly Precipitation	(mm) (in)	27.9 1.1	12.7 .5	22.9 .9	38.1 1.5	10.2 .4	40.6 1.6	40.6 1.6	22.9 .9	# #	5.1 .2	10.2 .4	7.6 .3	# #	35 35
Mean Number Days with Precipitation Equal to or Greater Than 0.1 in (2.54mm)		9	9	10	8	9	10	13	11	8	6	7	8	108	33
Mean Number Days with Thunderstorms		#	1	2	4	5	7	11	8	3	1	1	#	43	27
Mean Monthly Snowfall	(mm) (in)	2.5 .1	# #	2.5 .1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	# #	2.5 .1	7.6 .3	27 27
Mean Snow Depth	(mm) (in)	18 .7	13 .5	10 .4	0 0	0 0	0 0	0 0	0 0	0 0	0 0	# #	18 .7	56 2.2	35 35
Maximum Snow Depth	(mm) (in)	180 7	130 5	200 8	0 0	0 0	0 0	0 0	0 0	0 0	0 0	# #	360 14	360 14	27 27
Mean Number Days with Snowfall Equal to or Greater Than 1.5 in (38.1mm)		#	#	#	0	0	0	0	0	0	0	0	#	#	27

3. HUMIDITY

Mean Percent Relative Humidity		71.6	67.8	64.6	63.1	67.7	71.0	75.3	76.2	76.1	74.3	71.8	71.9	71.0	35
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4. WIND

Percent Frequency of Surface Wind Speed Equal to or Greater Than 28 Knots (32.24 mph or 51.9 kmph)		.1	.1	.1	.1	0	0	0	0	0	0	0	0	0	35
Percent Frequency of Surface Wind Speed Equal to or Greater Than 17 knots (19.58 mph or 31.5 kmph)		2.0	3.1	3.4	2.9	1.1	.7	.6	.6	.5	.6	1.0	1.2	1.4	35
Fastest One-Minute Wind-Speed	(Knots) (Kmph)	47 87.1	56 103.8	59 109.3	48 88.9	43 79.7	50 92.7	56 103.8	54 100.1	46 85.2	61 113.0	51 94.5	48 88.9	61 113.0	22 22

H. CLIMATE (continued)

5. VISIBILITY

Percent Frequency Visibility Less Than 0.5 mile (0.8 km)		1.3	1.3	.8	.4	.4	.3	.5	.9	1.1	1.3	1.3	1.8	.9	35
Percent Frequency Ceiling Less Than 5,000 ft. (1524 m) or Visibility Less Than 5 Miles (8.047 km)		33.9	32.1	27.0	21.8	24.4	25.8	28.5	30.0	29.3	28.4	26.5	28.6	28.0	35
Percent Frequency Ceiling Less Than 1,500 ft (457.2 m) or Visibility Less Than 3 Miles (4.828 km)	(for 0000-0200 EST)	19	17	13	10	16	9	9	10	13	16	13	15	13	35
	(for 0300-0500 EST)	22	20	17	14	16	17	20	23	24	24	16	18	19	35
	(for 0600-0800 EST)	25	24	21	15	18	21	24	30	30	28	22	21	23	35
	(for 0900-1100 EST)	22	18	17	10	10	9	12	13	15	16	14	18	15	35
	(for 1200-1400 EST)	18	14	12	6	5	4	5	5	7	8	9	14	9	35
	(for 1500-1700 EST)	15	12	10	5	4	3	4	3	6	7	7	12	7	35
	(for 1800-2000 EST)	16	14	10	5	5	4	4	5	6	8	8	12	8	35
	(for 2100-2300 EST)	17	14	11	6	6	5	5	5	8	10	9	14	9	35
Percent Frequency Ceiling Less Than 300 ft. (91.4 m) or Visibility Less Than 1 mile (1.609 km)	(for 0000-0200 EST)	4.5	3.9	2.3	1.2	1.2	0.7	0.9	1.4	2.0	3.4	2.8	5.2		34
	(for 0300-0500 EST)	5.8	5.1	3.7	2.5	3.1	3.0	4.2	6.2	7.1	7.8	5.4	6.4		34
	(for 0600-0800 EST)	6.8	6.2	4.9	2.9	2.7	2.6	3.7	6.6	9.2	9.7	6.4	6.7		34
	(for 0900-1100 EST)	3.5	2.5	1.7	0.5	0.2	0.1	0.2	0.3	0.4	1.4	1.8	2.6		34
	(for 1200-1400 EST)	1.2	1.3	1.1	0.3	0.1	0.2	0.4	0.2	0.1	0.3	0.6	1.3		34
	(for 1500-1700 EST)	1.3	1.4	1.0	0.3	0.2	0.2	0.3	0.4	0.4	0.3	0.9	1.5		34
	(for 1800-2000 EST)	2.3	2.0	1.5	0.5	0.1	0.3	0.4	0.2	0.5	0.4	1.4	2.3		34
	(for 2100-2300 EST)	3.6	2.7	1.7	0.7	0.4	0.1	0.2	0.3	0.4	1.4	1.7	3.7		34
*Percent Frequency Sky Cover Less Than 30%	(at 1900 EST)	40.3	40.2	40.3	40.0	35.4	30.4	23.6	30.3	41.1	52.7	49.2	47.7		24
	(at 0100 EST)	47.2	48.4	51.4	53.7	51.2	51.0	47.1	51.2	55.0	59.8	55.3	54.2		24
	(at 0700 EST)	36.6	39.9	38.0	39.4	34.1	33.1	28.5	31.9	35.4	45.8	46.0	41.2		24
	(at 1300 EST)	31.7	33.1	32.9	30.0	26.9	20.2	15.2	18.3	29.2	43.2	40.5	37.8		24
*Percent Frequency Visibility Greater Than or Equal to 3 Miles (4.828 km)	(at 1900 EST)	91.3	92.8	94.7	97.4	98.7	98.6	98.3	98.2	97.3	96.9	96.3	93.7		34
	(at 0100 EST)	89.2	91.7	93.7	96.6	97.5	97.9	97.7	96.5	95.1	91.4	92.9	91.1		34
	(at 0700 EST)	85.0	84.9	87.9	92.8	92.9	91.2	89.9	83.1	82.1	81.5	85.4	86.7		34
	(at 1300 EST)	92.8	94.0	95.0	98.2	99.1	99.3	98.8	98.8	98.4	97.5	96.8	93.9		34
Mean Number Days with Ceiling Equal to or Greater Than 1000 ft (304.8 m) and Visibility Equal to or Greater Than 3 Miles (4.828 km)	(at 1900 EST)	26.8	25.2	28.6	28.8	30.0	29.3	30.1	30.0	28.6	29.1	28.2	27.7		34
	(at 0100 EST)	25.9	24.3	27.6	27.9	28.7	27.8	29.0	28.5	26.7	27.0	26.7	26.9		34
	(at 0700 EST)	24.3	22.2	25.5	26.3	26.8	25.1	25.0	23.0	22.1	23.2	24.0	25.2		34
	(at 1300 EST)	26.8	25.2	28.3	29.0	30.3	29.4	30.3	30.3	29.0	29.4	28.3	27.7		34
Mean Number Days with Ceiling Equal to or Greater Than 2000 ft (609.6 m) and Visibility Equal to or Greater Than 3 Miles (4.828 km)	(at 1900 EST)	25.6	24.0	27.7	28.1	29.0	28.6	29.4	29.2	27.7	28.0	27.3	26.8		34
	(at 0100 EST)	24.6	23.9	26.4	26.5	27.6	26.9	27.8	27.6	25.7	25.7	25.7	26.0		34
	(at 0700 EST)	22.7	21.0	24.0	24.9	24.6	23.1	22.7	21.1	20.6	21.9	23.0	23.9		34
	(at 1300 EST)	24.7	23.6	26.6	27.6	28.8	28.5	28.8	28.7	26.9	27.6	26.8	26.3		34
Mean Number Days with Ceiling Equal to or Greater Than 2500 ft (762.0 m) and Visibility Equal to or Greater Than 3 Miles (4.828 km)	(at 1900 EST)	25.2	23.5	27.7	27.7	28.6	28.1	29.0	24.6	27.1	27.5	26.9	26.5		34
	(at 0100 EST)	24.3	22.5	26.1	26.1	27.0	26.5	27.4	25.1	25.1	25.2	25.4	25.5		34
	(at 0700 EST)	22.3	20.7	23.7	24.4	23.7	22.6	22.4	20.7	20.2	21.5	22.6	23.5		34
	(at 1300 EST)	24.1	22.9	25.9	25.0	27.7	27.6	27.3	27.1	25.6	26.7	26.2	25.6		34
Mean Number Days with Ceiling Equal to or Greater Than 6,000 ft (1,828.9 km) and Visibility Equal to or Greater Than 3 Miles (4.828 km)	(at 1900 EST)	21.8	20.1	24.4	24.4	24.8	23.6	24.0	24.6	24.5	24.6	23.6	23.6		34
	(at 0100 EST)	21.8	19.7	23.4	24.1	24.8	24.7	25.4	25.1	23.3	21.0	23.2	23.1		34
	(at 0700 EST)	19.4	18.4	21.3	22.4	22.1	21.1	21.0	19.4	20.7	22.7	20.5	20.9		34
	(at 1300 EST)	21.2	19.8	21.7	20.9	20.3	18.6	18.4	18.6	22.3	24.4	24.4	22.8		34
Mean Number Days with Ceiling Equal to or Greater Than 10,000 ft (3048.0 m) and Visibility Equal to or Greater Than 3 Miles (4.828 km)	(at 1900 EST)	19.7	18.2	22.3	22.5	22.9	21.8	22.2	22.7	22.3	23.5	21.9	22.0		34
	(at 0100 EST)	20.1	18.2	21.7	22.3	23.1	23.3	23.8	23.8	22.4	22.4	21.5	21.6		34
	(at 0700 EST)	17.5	16.7	19.0	20.3	20.5	20.0	18.1	18.1	17.3	18.4	18.9	19.2		34
	(at 1300 EST)	19.1	18.1	19.9	19.4	19.1	17.3	17.6	17.6	18.5	21.7	21.6	20.8		34

#Less Than 0.5 day, 0.5 inch, or 0.5 percent, as appropriate

*Data available only in percent frequency, rather than mean number days. Information relating sky cover to visibility not available.

EPHEMERIS FOR FORT BRAGG, NORTH CAROLINA (EASTERN STANDARD TIME)

NAUTICAL TWILIGHT										NAUTICAL TWILIGHT				
DATE	BEGINNING	END	SUNRISE	SUNSET	DATE	BEGINNING	END	SUNRISE	SUNSET	DATE	BEGINNING	END	SUNRISE	SUNSET
January 1	0624	1814	0724	1715	May 1	0425	2001	0525	1901	September 1	0451	1939	0548	1843
January 11	0625	1822	0725	1723	May 11	0414	2011	0515	1909	September 11	0500	1924	0555	1829
January 21	0624	1831	0722	1733	May 21	0405	2020	0508	1917	September 21	0508	1909	0603	1814
February 1	0618	1841	0715	1744	June 1	0358	2030	0503	1925	October 1	0515	1855	0610	1800
February 11	0610	1850	0706	1754	June 11	0354	2037	0501	1931	October 11	0523	1841	0618	1746
February 21	0600	1858	0657	1803	June 21	0355	2040	0502	1933	October 21	0531	1829	0627	1734
March 1	0551	1906	0646	1811	July 1	0358	2040	0505	1934	November 1	0540	1818	0637	1722
March 11	0538	1914	0632	1820	July 11	0405	2037	0510	1932	November 11	0549	1810	0646	1713
March 21	0524	1923	0619	1828	July 21	0413	2031	0516	1927	November 21	0558	1805	0656	1707
April 1	0508	1932	0603	1837	August 1	0423	2021	0524	1919	December 1	0606	1803	0705	1704
April 11	0453	1942	0549	1845	August 11	0435	2009	0532	1909	December 11	0614	1804	0714	1704
April 21	0439	1951	0537	1853	August 21	0442	1955	0540	1857	December 21	0620	1808	0720	1707

I. CROSS—COUNTRY MOVEMENT

MAP UNIT	GENERALIZED TERRAIN CONDITIONS	MOVEMENT OF TRACKED VEHICLES*	MOVEMENT OF WHEELED VEHICLES**	MOVEMENT OF FOOT TROOPS
1	Dominantly open, cleared areas, gently rolling uplands. Most slopes between 0 to 8 percent. Areas mostly cleared and used for varied training purposes (maneuver areas, firing ranges, air landing strips, drop zones, etc.) soils predominantly sandy with clayey sand in borrow pits off Lamont Road and Chicken Road. Some areas include wildlife feed fields.	Generally easy in any direction for both tank and APC when soils dry. During wet period; movement of tank somewhat slowed by soft soils except in very sandy areas. Movement of APC essentially unaffected by wet soils.	Fairly easy most of the year. Slowed after rains on some upslopes. Movement somewhat difficult where deep accumulation of loose, sandy soil occur, especially after soil has been repeatedly passed over and "fluffed" by vehicle traffic.	Unhindered in most places. Slowed during wet period when soils are soft. Movement slowed slightly on drop zones with troops carrying heavy equipment due to large accumulations of sand.
2	Sparsely forested, scrub oak and widely spaced pines. Most slopes between 3 to 8 percent. Soils predominantly sandy. Some areas consist of fields of scrub oak with few widely spaced pines generally 25 m or greater apart. Some areas mostly pines with few scrub oak and grass.	Unrestricted for both tank and APC movement throughout the year. Scrub oak may restrict visibility. Most trees pushed over easily. Drainage ways passing through areas may be crossed with caution.	Moderately hindered by scrub oak, vegetation and loose sand. Movement fairly easy through widely spaced pine stands on upper slopes. Movement conditions improved when soil is moist.	Slightly slowed by scrub oak and loose sand. Movement easy through widely spaced pine stands, slowed slightly by drainageways passing through some areas.
3	Moderately dense, forested uplands. Slopes between 3 to 15 percent; most slopes between 3 to 8 percent. Soils sandy and well-drained. Vegetation mainly coniferous. Tree spacings range from 2.5 to 5.0 m (8-16 ft) apart. Trunk diameters range mostly between 10 to 30 cm (4 to 12 in) diameter breast height.	Tank movement moderately slowed, but not stopped by randomly spaced trees. APC slowed but not as severely as tank. Soils usually well drained and present no particular problem in movement.	Moderately restricted by randomly spaced trees too large to push over. Movement easy in small openings, but only for short distances.	Moderately slowed by combined effects of trees, brushy vegetation in some forest openings, and locally steep slopes.
4	Densely forested bottomlands. Slopes range from 3 to 15 percent. Most slopes between 8 to 15 percent. Seasonally soft soils due to high water table. Vegetation predominantly hardwoods with few scattered pines. Trunk diameters range from 15 to 25 cm (5.9 to 9.8 in). Tree spacing 1 to 5 m (3 to 16 ft). Undergrowth fairly dense in localized areas.	Movement severely slowed to precluded in most densely forested areas. Most trees cannot be pushed over. Seasonally soft soils additionally impair movement. APC moderately slowed. Poor visibility due to thick undergrowth, and trees when in leaf.	Not practical except where slopes are relatively flat. Movement extremely restricted in flatter areas due to close tree spacing and soft soils resulting from seasonal high water table.	Moderately slowed. Movement slowed by dense undergrowth and soft soils.
5	Poorly drained, forested drainage ways and bottom lands containing swampy depressions. Slopes between 0 to 3 percent. Vegetation predominantly lowland hardwoods with dense undergrowth. Soils sandy to loamy. Soil bearing strength low in many areas.	Precluded for tanks due to dense vegetation and miry soils. Local movement feasible for APCs with some risk of immobilization.	Precluded by dense vegetation and soft soil along portions of many drainage ways.	Severely slowed by dense forest undergrowth and poorly drained soils along portions of many drainage ways. Visibility restricted when vegetation is in full leaf.

*Comments apply to the M-60 tank and the M-113 armored personnel carrier (APC).

**Comments apply to the M-35 2 1/2t truck and the M151 1/4t truck.

Explanation of wet and dry periods.

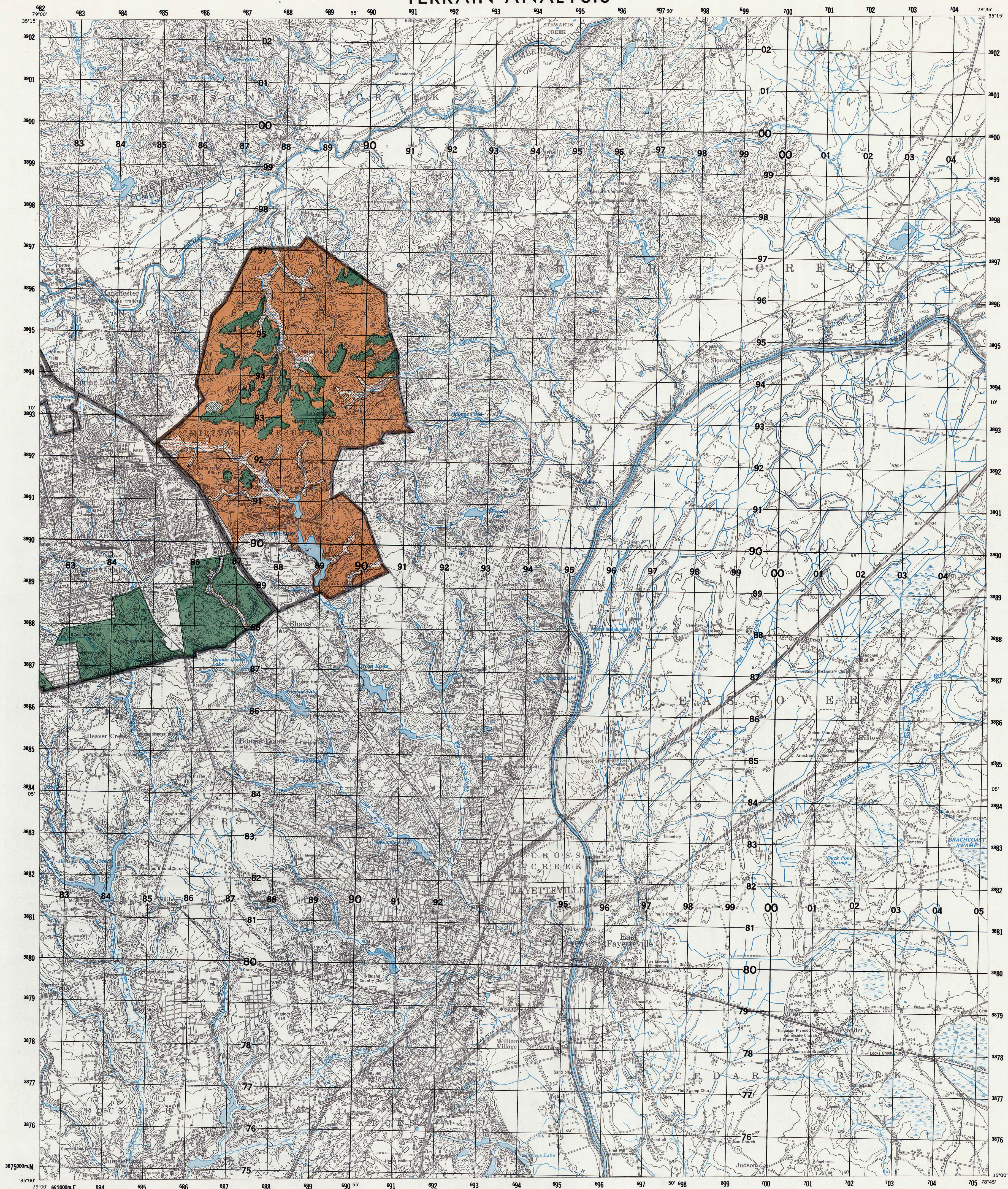
Dry Period - The period when soil moisture is relatively low and the water table has been lowered by actively growing vegetation. In most years, this period extends from about mid-April through November. Unusual climatic variations may drastically alter this period.

Wet Period - The period when soil moisture is relatively high and the water table is raised mainly due to the dormancy of vegetation. In most years this period extends from about December through mid-April. Wet periods, generally of short duration, may occur at other times of the year.

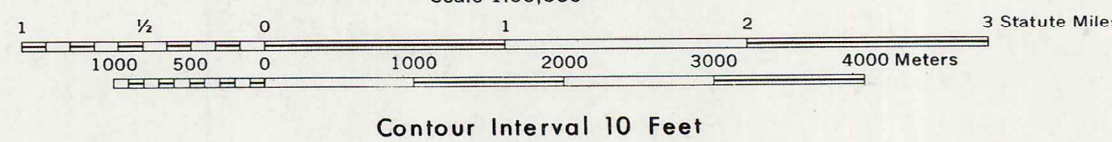
NOTES: The terms "wet period" and "dry period" as used here, do not necessarily correlate with monthly or seasonal precipitation amounts recorded on the reservation.

Impact areas are restricted to vehicle and foot troop movement due to danger from unexploded munitions.

Several hundred miles of unmaintained fire breaks assist cross-country movement operations. These fire breaks have not been considered in the movement evaluations. Refer to Lines of Communications topic for information on these breaks.



Cartographic and reproduction support provided by the 63D Engineer Company (Topographic) (Corps), Ft. Bragg, North Carolina 28307. November, 1977



Prepared by the 283D Engineer Detachment (Terrain) under the direction of the Terrain Analysis Center, US Army Engineer Topographic Laboratories Ft. Belvoir, Virginia, 22060.

INDEX TO ADJOINING SHEETS		
5254 I	5254 IV	5254 V
5254 II	5254 III	5254 VI
5254 VII	5254 VIII	5254 IX

Sheet 5254 III falls within NI 17-3, V501, 1:250,000

EXPLANATION OF WET AND DRY PERIODS

* DRY PERIOD The period when soil moisture is relatively low and the water table has been lowered by actively growing vegetation. In most years this period extends from about mid-April through November. Unusual climatic variations may drastically alter this time period.

* WET PERIOD The period when soil moisture is relatively high and the water table is raised mainly due to the dormancy of vegetation. In most years this period extends from about December through mid-April. Wet periods, generally of short duration may occur at other times of the year.

EXPLANATION OF RATING TERMS

GOOD Conditions permit free movement in any direction. Terrain will permit 12 or more passes in trace of an M-60 tank or permit at least one maneuver (starts, stops, sharp turns, or crossing of tracks) at one location.

FAIR Conditions moderately hinder progress or moderately restrict choices of direction for movement. Terrain will permit 3 to 12 passes in trace but maneuvering will be difficult.

POOR Conditions severely hinder progress or greatly restrict choice of movement routes. Terrain will probably permit up to 3 passes in trace. Very cautious driving required. Movement in trace should be avoided.

UNSUITED Conditions preclude all but local movement. Engineer work required for vehicular movement.

CROSS-COUNTRY MOVEMENT

MAP UNIT	TERRAIN UNIT	PREDICTED MOVEMENT RATINGS FOR:									
		TANK (M-60)		APC (M-113)		2 1/2 t. TRUCK (M-35)		1/2 t. TRUCK (M-151)		FOOT TROOPS	
		Dry Period*	Wet Period**	Dry Period	Wet Period	Dry Period	Wet Period	Dry Period	Wet Period	Dry Period	Wet Period
1	Dominantly open cleared areas	Good	Fair	Good	Good	Good	Fair	Good	Good	Good	Good
2	Sparsely forested, scrub oak and widely spaced pines	Good	Good	Good	Good	Fair	Fair	Fair	Fair	Good	Good
3	Moderately dense forested uplands	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Good	Fair
4	Densely forested bottomlands	Poor	Poor	Fair	Poor	Unsuited	Unsuited	Unsuited	Unsuited	Fair	Poor
5	Poorly drained, forested drainage ways and bottomlands containing swampy depressions	Unsuited	Unsuited	Poor	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited	Poor	Poor

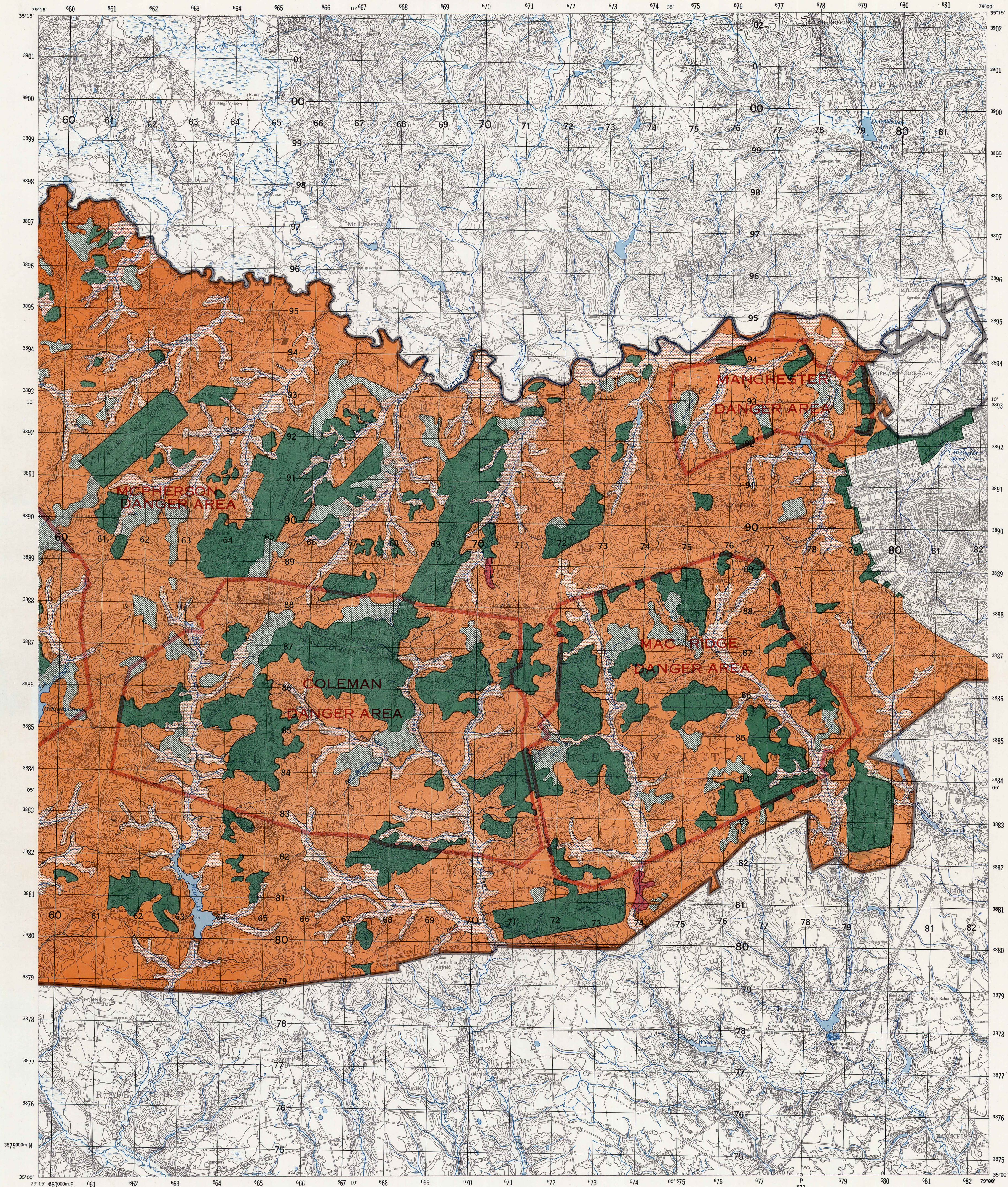
NOTES

This map deals with cross-country movement, or movement away from roads, and is primarily intended for use in planning operations. For determining exact driving routes, reconnaissance on the ground is required. Data on the terrain factors and the evaluations are generalized to suit the scale of the map. Many areas of minor areal extent, such as small tracts of forest, cleared areas, and depressions are too small to portray.

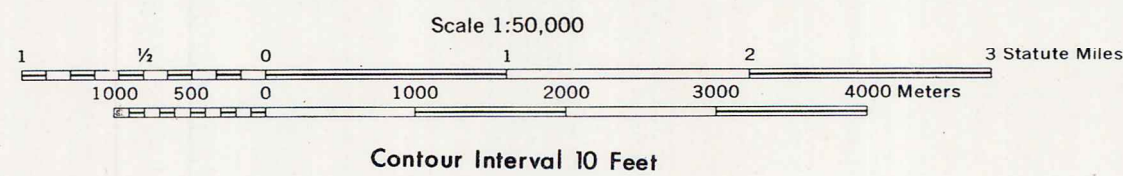
The predicted movement ratings are those believed to prevail in most years. Variations in these evaluations may occur from year to year and even within a season due to abnormal variations in the weather. The evaluations are based on terrain conditions as they are known at present. Future alterations of the terrain, such as timber clearing operations, artificial drainage, and road construction would obviously change cross-country movement conditions.

Built-up areas not evaluated.

DANGER AREAS Access restricted due to unexploded munitions.

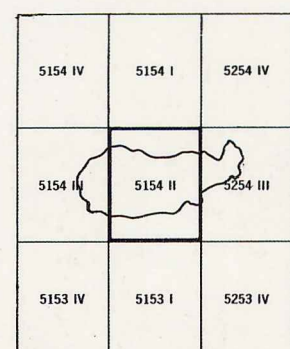


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Prepared by the 283D Engineer Detachment (Terrain) under the direction of the Terrain Analysis Center, US Army Engineer Topographic Laboratories Ft. Belvoir, Virginia, 22060.

ADJOINING SHEETS



Sheet 5154 II falls within N1 17.3, V801, 1:250,000

EXPLANATION OF WET AND DRY PERIODS

* DRY PERIOD The period when soil moisture is relatively low and the water table has been lowered by actively growing vegetation. In most years this period extends from about mid-April through November. Unusual climatic variations may drastically alter this time period.

* WET PERIOD The period when soil moisture is relatively high and the water table is raised mainly due to the dormancy of vegetation. In most years this period extends from about December through mid-April. Wet periods, generally of short duration, may occur at other times of the year.

EXPLANATION OF RATING TERMS

GOOD Conditions permit free movement in any direction. Terrain will permit 12 or more passes in trace of an M-60 tank or permit all-terrain maneuver (starts, stops, sharp turns, or crossing of tracks) at one location.

FAIR Conditions moderately hinder progress or moderately restrict choices of direction for movement. Terrain will permit 3 to 12 passes in trace but maneuvering will be difficult.

POOR Conditions severely hinder progress or greatly restrict choice of movement routes. Terrain will probably permit up to 3 passes in trace. Very cautious driving required. Movement in trace should be avoided.

UNSUITED Conditions preclude all but local movement. Engineer work required for vehicular movement.

CROSS-COUNTRY MOVEMENT

MAP UNIT	TERRAIN UNIT	PREDICTED MOVEMENT RATINGS FOR:									
		TANK (M-60)		APC (M-113)		2 1/2 T. TRUCK (M-35)		1/2 T. TRUCK (M-151)		FOOT TROOPS	
		Dry Period*	Wet Period**	Dry Period	Wet Period	Dry Period	Wet Period	Dry Period	Wet Period	Dry Period	Wet Period
1	Dominantly open cleared areas	Good	Fair	Good	Good	Good	Fair	Good	Good	Good	Good
2	Sparsely forested, scrub oak and widely spaced pines	Good	Good	Good	Good	Fair	Fair	Fair	Fair	Good	Good
3	Moderately dense, forested uplands	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Good	Fair
4	Densely forested bottomlands	Poor	Poor	Fair	Poor	Unsuited	Unsuited	Unsuited	Unsuited	Fair	Poor
5	Poorly drained, forested drainage ways and bottomlands containing swampy depressions	Unsuited	Unsuited	Poor	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited	Poor	Poor

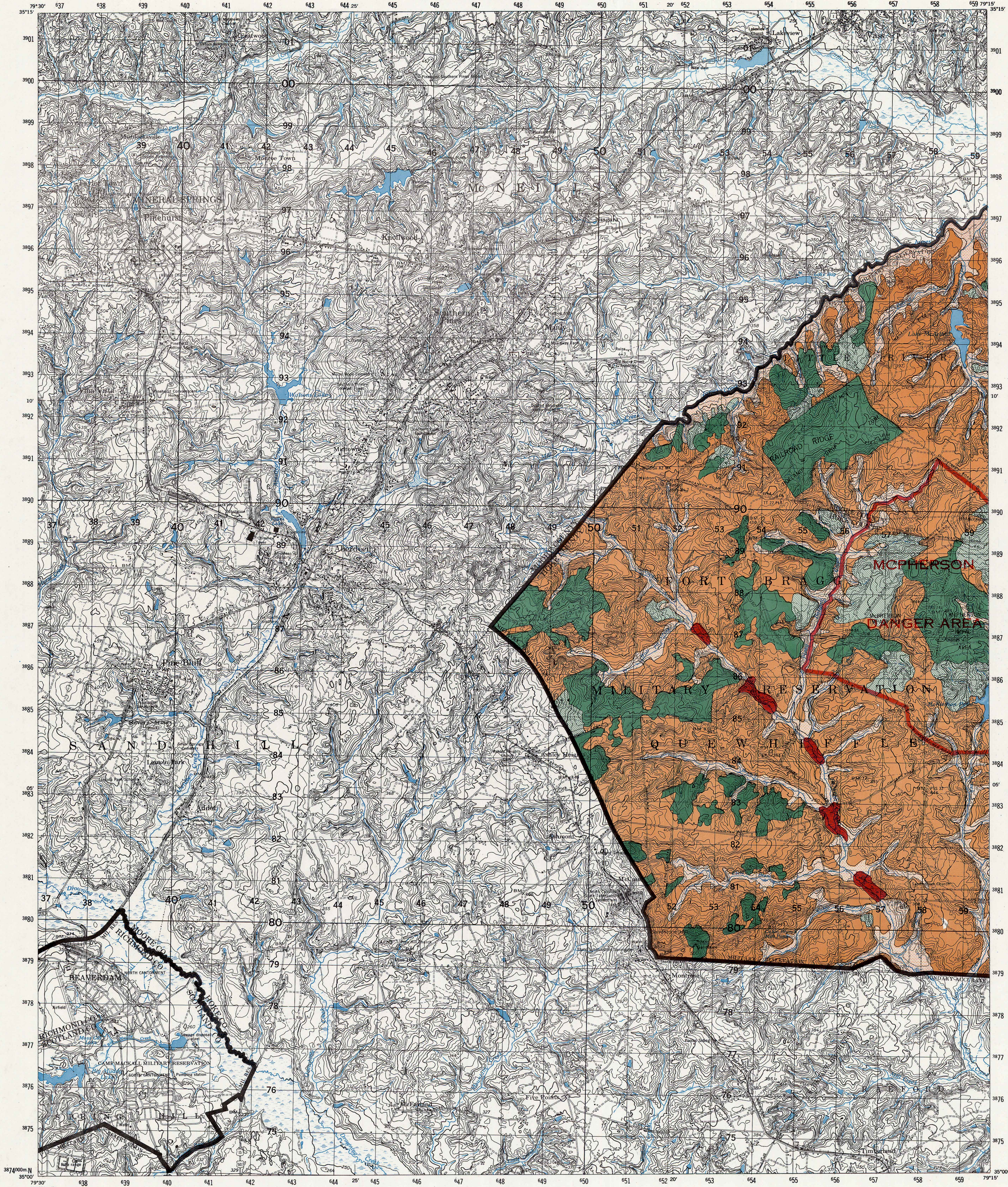
NOTES

This map deals with cross-country movement, or movement away from roads, and is primarily intended for use in planning operations. For determining exact driving routes, reconnaissance on the ground is required. Data on the terrain factors and the evaluations are generalized to suit the scale of the map. Many areas of minor areal extent, such as small tracts of forest, cleared areas, and depressions are too small to portray.

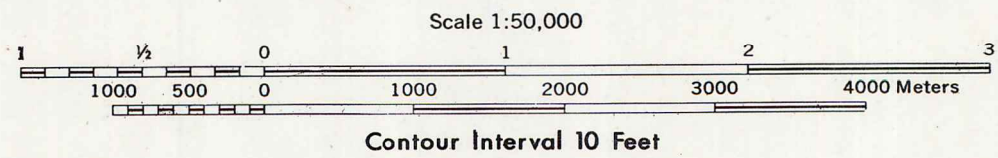
The predicted movement ratings are those believed to prevail in most years. Variations in these evaluations may occur from year to year and even within a season due to abnormal variations in the weather. The evaluations are based on terrain conditions as they are known at present. Future alterations of the terrain, such as timber clearing operations, artificial drainage, and road construction would obviously change cross-country movement conditions.

Build-up areas not evaluated.

DANGER AREAS Access restricted due to unexploded munitions.



Cartographic and reproduction support provided by the 63D Engineer Company (Topographic) (Corps), Ft. Bragg, North Carolina 28307 November, 1977



Prepared by the 283D Engineer Detachment (Terrain) under the direction of the Terrain Analysis Center, US Army Engineer Topographic Laboratories Ft. Belvoir, Virginia, 22060.

INDEX TO ADJOINING SHEETS

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Sheet 5154 III falls within N 17.3, V501, 1:250,000

NOTES

This map deals with cross-country movement, or movement away from roads, and is primarily intended for use in planning operations. For determining exact driving routes, reconnaissance on the ground is required. Data on the terrain factors and the evaluations are generalized to suit the scale of the map. Many areas of minor areal extent, such as small tracts of forest, cleared areas, and depressions are too small to portray.

The predicted movement ratings are those believed to prevail in most years. Variations in these evaluations may occur from year to year and even within a season due to abnormal variations in the weather. The evaluations are based on terrain conditions as they are known at present. Future alterations of the terrain, such as timber clearing operations, artificial drainage, and road construction would obviously change cross-country movement conditions.

Built-up areas not evaluated

DANGER AREAS Access restricted due to unexploded munitions.

EXPLANATION OF WET AND DRY PERIODS

- * DRY PERIOD** The period when soil moisture is relatively low and the water table has been lowered by actively growing vegetation. In most years this period extends from about mid-April through November. Unusual climatic variations may drastically alter this time period.
- * WET PERIOD** The period when soil moisture is relatively high and the water table is raised mainly due to the dormancy of vegetation. In most years this period extends from about December through mid-April. Wet periods, generally of short duration, may occur at other times of the year.

EXPLANATION OF RATING TERMS

- GOOD** Conditions permit free movement in any direction. Terrain will permit 12 or more passes in trace of an M-60 tank or permit at least one maneuver (starts, stops, sharp turns or crossing of tracks) at one location.
- FAIR** Conditions moderately hinder progress or moderately restrict choices of direction for movement. Terrain will permit 3 to 12 passes in trace but maneuvering will be difficult.
- POOR** Conditions severely hinder progress or greatly restrict choice of movement routes. Terrain will probably permit up to 3 passes in trace. Very cautious driving required. Movement in trace should be avoided.
- UNSUITED** Conditions preclude all but local movement. Engineer work required for vehicular movement.

CROSS-COUNTRY MOVEMENT

MAP UNIT	TERRAIN UNIT	PREDICTED MOVEMENT RATINGS FOR:									
		TANK (M-60)		APC (M-113)		2 1/2 t. TRUCK (M-35)		1/4 t. TRUCK (M-151)		FOOT TROOPS	
		Dry Period*	Wet Period**	Dry Period	Wet Period	Dry Period	Wet Period	Dry Period	Wet Period	Dry Period	Wet Period
1	Dominantly open cleared areas	Good	Fair	Good	Good	Good	Fair	Good	Good	Good	Good
2	Sparsely forested, scrub oak and widely spaced pines	Good	Good	Good	Good	Fair	Fair	Fair	Fair	Good	Good
3	Moderately dense forested uplands	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Good	Fair
4	Densely forested bottomlands	Poor	Poor	Fair	Poor	Unsuited	Unsuited	Unsuited	Unsuited	Fair	Poor
5	Poorly drained, forested drainage ways and bottomlands containing swampy depressions	Unsuited	Unsuited	Poor	Unsuited	Unsuited	Unsuited	Unsuited	Unsuited	Poor	Poor

J. LINES OF COMMUNICATION

1. ROADS

The road system of Fort Bragg is a fairly dense network of Federal and North Carolina state hard-surface highways, reservation hard-surfaced roads, tank trails, and improved and unimproved dirt roads. Together, they provide Fort Bragg with over 1,196 kilometers (793 miles) of roads. The hard-surfaced roads depicted total about 200 kilometers (124 miles) and are open at all times to civil and military wheeled vehicles. The depicted dirt roads, totaling about 949.7 kilometers (627.4 miles), are used by both wheeled and tracked vehicles. However, tracked vehicles are

restricted to designated tank trails when moving on and off the cantonment area. Tank trails comprise 46.4 kilometers (28.8 miles) of the dirt roads.

Most of the unimproved dirt roads, particularly the east-west roads, are comprised of numbered firebreaks. These firebreaks are trafficable by both wheeled and tracked vehicles, but are off limits to privately owned vehicles. Not all roads on the reservation are depicted. There are many additional miles of roads that are shown on the base maps, which are grown over with vegetation and are not considered in this study.

ROUTE NUMBER/ NAME	ROUTE LOCATION (GRID REFERENCE)			MILITARY LOAD CLASSI- FICATION	ROUTE TYPE	SURFACE		SHOULDERS		REMARKS
	FROM	TO	LENGTH OF SEGMENT			CONSTRUCTION MATERIALS	WIDTH	CONSTRUCTION MATERIALS	WIDTH	
NC 87	858873	847925	5.5 km (3.4 mi)	No Data	All Weather	Asphaltic Concrete	6.7 m (22 ft) each lane 9.2 m (30 ft) median	Sod	7.6 m (25 ft)	4 lanes, divided
NC 210	879884	850924	5.2 km (3.2 mi)	No Data	All Weather	Asphaltic Concrete	7.3 m (24 ft) each lane 9.2 m (30 ft) median	Sod	7.6 m (25 ft)	4 lanes, divided
Honeycutt Road	893911	828896	7.1 km (4.4 mi)	No Data	All Weather	Bituminous	6.7 m (22 ft)	Sod	4.6 m (15 ft)	Constricted 2 lane from 893911 to 852906 4 lanes from 852906 to 828896
Mckormick Bridge Road	895946	888971	2.6 km (1.6 mi)	No Data	All Weather	Bituminous	6.1 m (20 ft)	Sod	3.4 m (11 ft)	Constricted 2 lanes
MacArthur Road	900923	904960	4.3 km (2.6 mi)	No Data	All Weather	Bituminous	6.7 m (22 ft)	Sod	2.7 m (9 ft)	Constricted 2 lanes
Ray Road	690920	691928	0.9 km (0.6 mi)	No Data	All Weather	Bituminous	6.7 m (22 ft)	Sod	5.8 m (19 ft)	Constricted 2 lane
LaMont Road	745938	759894	4.7 km (2.9 mi)	No Data	All Weather	Bituminous	7.3 m (24 ft)	Sod	4.3 m (14 ft)	
Yadkin Road	759894	801881	4.8 km (3.0 mi)	No Data	All Weather	Bituminous	7.3 m (24 ft)	Sod	4.3 m (14 ft)	
Mckellar Road	749912	771923	2.5 km (1.6 mi)	No Data	All Weather	Bituminous	7.3 m (24 ft)	Sod	6.4 m (21 ft)	
Gruber Road	772923	869898	12.6 km (7.8 mi)	No Data	All Weather	Bituminous	7.3 m (24 ft)	Sod	3.4 m (11 ft) No Sholders	2 lane from 772923 to 787916 4 lane from 787916 to 869888 Bridge load classification at All American Expressway (1)55W, 58T: (2)55W, 58T
MacRidge Road	772888	794850	4.4 km (2.8 mi)	No data	All weather	Bituminous	7.3 m (24 ft)	Sod	3.7 m (12 ft)	
Plank Road	516792	761829	27.1 km (16.8 mi)	No data	All weather	Bituminous	7.3 m (24 ft)	Sod	4.6 m (15 ft)	
King Road	523795	518907	12.4 km (7.7 mi)	No data	All weather	Bituminous	7.3 m (24 ft)	Sod	3.0 m (10 ft)	
Morganton Southern Pines Road	508910	518907	1.0 km (0.6 mi.)	No data	All weather	Bituminous	7.3 m (24 ft)	Sod	3.7 m (12 ft)	
Manchester Road	518907	796942	29.6 km (19.3 mi)	No data	All weather	Bituminous	7.3 m (24 ft.)	Sod	4.9 m (16 ft.)	
RaeFord and Vass Road	611788	612805	1.7 km (1.1 mi)	No data	All weather	Bituminous	7.3 m (24 ft.)	Sod	3.7 m (12 ft.)	
Chicken Road	719816	823865	10.6 km (6.8 mi)	No data	All weather	Bituminous	7.3 m (24 ft.)	Sod	3.4 m (11 ft.)	
Smith Lake Road	874891	895895	2.6 km (1.6 mi)	No data	All weather	Bituminous	7.3 m (24 ft.)	Sod	4.0 m (13 ft.)	
Preacher's Road	719816	711878	6.4 km (3.9 mi)	No data	All weather	Bituminous	7.3 m (24 ft.)	Sod	3.4 m (11 ft.)	
Longstreet Road	689880	823915	14.0 km (8.7 mi)	No data	All weather	Bituminous	7.3 m (24 ft) 15.2 m (50 ft)	Sod	4.3 m (14 ft.)	2 lanes from 689880 to 790905 4 lanes from 790905 to 823915
Blues Road	657922	671937	1.9 km (1.3 mi)	No data	All weather	Bituminous	6.7 m (22 ft.)	Sod	4.3 m (14 ft.)	Constricted 2 lanes
Coolyconch Mtn Road	762896	759905	1.0 km (0.6 mi)	No data	All weather	Bituminous	6.7 m (22 ft.)	Sod	4.0 m (13 ft.)	Constricted 2 lanes
Yadkin MacRidge Cutoff	782867	802882	2.6 km (1.6 mi)	No data	All weather	Bituminous	7.3 m (24 ft)	Sod	4.0 m (13 ft.)	
Simmons Perimeter Road	869898	Loop	5.2 km (3.2 mi)	No data	All weather	Bituminous	6.7 m (22 ft)	Sod	2.7 m (9 ft.)	Constricted 2 lanes
Ammunition Storage Road	791845	Loop	5.2 km (3.2 mi)	No data	All weather	Bituminous	3.4 - 6.7 m (11 - 22 ft)	Sod	4.0 m (13 ft.)	Constricted 2 lanes
Manchester Range Road	779946	785944	1.4 km (0.9 mi)	No data	All weather	Bituminous	6.1m(20 ft)	Sod	0.6 m (2 ft.)	Constricted 2 lanes Choke Point
Unnamed Road to Lobelia	659948	653956	0.9 km (0.6 mi.)	No data	All weather	Bituminous	5.5 m (18 ft)	Sod	3 m (10 ft.)	Constricted 2 lanes Choke point at Morrison Bridge 3.4 m (11'3") (1)40W, 30T
RaeFord Road	813862	813874	0.8 km (0.5 mi.)	No data	All weather	Bituminous	7.3 m (24 ft.)	Sod	4.0m(13 ft)	
Gorham Road	795913	789942	3.2 km (2.0 mi)	No data	All weather	Bituminous	7.3 m (24 ft.)	Sod	4.0m(13 ft)	
Butner Road	847924	789912	6.5 km (4.0 mi)	No data	All weather	Bituminous	13.7 m (45 ft)	Not Applicable	Not Applicable	4 lanes
Reilly Road	819930	814863	7.6 km (4.7 mi)	No data	All weather	Bituminous	14.6 m (48 ft)	Not Applicable	Not Applicable	4 lanes from 819930 to 823868 2 lanes from 823868 to 814863
Randolph Street	854918	828911	2.7 km (1.7 mi.)	No data	All weather	Bituminous	16.5 m (54 ft)	Not Applicable	Not Applicable	4 lanes
Knox Street	835919	858875	5.0 km (3.1 mi)	No data	All weather	Bituminous	15.5 m (51 ft)	Not Applicable	Not Applicable	4 lane
All American Expressway (Owen Drive)	846870	825898	Approximately 4 km (2.4 mi)	W T (1) 50 47 (2) 50 47	All weather	Bituminous		Bituminous		Construction to be completed 1978
Tank Trails					All weather	Sand and Clay (Road Crossing consist of Reinforced Concrete)	5.4 - 7.3 m (18 - 24 ft.)			Trails may or may not meet full military specifications.
Improved Dirt Roads					Fair weather (May become slippery and miry after heavy rain in some areas)	Sand and Clay	5.4 - 7.3 m (18 - 24 ft.)			
Unimproved Dirt Roads					Fair weather (May become slippery and miry after heavy rain in some areas)	Sand and Clay	3.0 - 7.3 m (10 - 24 ft.)			Not to be used on a day to day basis. Most roads are numbered firebreaks, which are off limits to POVs.

1. ROADS (Continued)

ROAD BRIDGES

There are eleven permanent bridges on Fort Bragg. The largest number are associated with the All American Expressway, connecting Fayetteville and Fort Bragg. These are modern reinforced concrete bridges suitable for heavy duty highway traffic. The permanent bridges in the range area of Fort Bragg are generally reinforced concrete bridges of very short span and consequently high load classification. The exception is the Morrison Bridge, which is timber trestle with steel stringers.

The large network of firebreaks on the Fort Bragg Reservation has approximately 85 timber trestle bridges, typically with a military load classification of about 15. For the purposes of this study, they are considered to be temporary in nature. They are inspected and replaced frequently and are occasionally used for training by the engineer troop units on post. They have not been included on the graphic associated with this study.

BRIDGE NO/NAME	ROUTE DESIGNATION	GRID REFERENCE	FEATURE CROSSED	MILITARY LOAD CLASSI- FICATION		DIMENSIONS	CLEARANCE	TYPE/CONSTRUCTION MATERIALS	CONDITION	REMARKS
				W	T					
1	All American Expressway (westbound)	828897	Reilly Road	(2) 55 (1) 55	53 53	52.2 m (171 ft 5 in) long; 14.6 m (48 ft) wide; roadway width 7.3 m (24 ft)	Unlimited vertical; 14.6 m (48 ft) horizontal.	Deck; Reinforced concrete	Good	
2	All American Expressway (eastbound)	828896	Reilly Road	(2) 55 (1) 55	53 53	52.2 m (171 ft 5 in) long; 12.2 m (40 ft) wide; roadway width 7.3 m (24 ft)	Unlimited vertical; 12.2 m (40 ft) horizontal.	Deck; Reinforced concrete	Good	
3	All American Expressway (southbound)	831897	Honeycutt Road	(2) 53 (1) 53	55 55	57.1 m (187 ft 5 in) long; 12.2 m (40 ft) wide; roadway width 7.3 m (24 ft)	Unlimited vertical; 12.2 m (40 ft) horizontal.	Deck; Reinforced concrete	Good	
4	All American Expressway (northbound)	832897	Honeycutt Road	(2) 52 (1) 52	53 53	57.3 m (187 ft 11 in) long; 14.7 m (48 ft) wide; roadway width 7.3 m (24 ft)	Unlimited vertical; 14.7 m (48 ft 3 in) horizontal.	Deck; Reinforced concrete	Good	
5	All American Expressway (southbound)	845872	Beaver Creek	(2) 50 (1) 50	47 47	41.0 m (134 ft 7 in) long; 12.2 m (40 ft) wide; roadway width 7.3 m (24 ft)	Unlimited vertical; 12.2 m (40 ft) horizontal.	Deck; Reinforced concrete	Good	
6	All American Expressway (northbound)	846872	Beaver Creek	(2) 50 (1) 50	47 47	41.1 m (134 ft 10 in) long; 12.2 m (40 ft) wide; roadway width 7.3 m (24 ft)	Unlimited vertical; 12.2 m (40 ft) horizontal.	Deck; Reinforced concrete	Good	
7	Gruber	840887	All American Expressway	(2) 55 (1) 55	58 58	72.5 m (237 ft 10 in) long; 23.5 m (77 ft) wide; roadway width 13.4 m (44 ft)	Unlimited vertical; 22.9 m (75ft 2in) horizontal.	Deck; Reinforced concrete	Good	
8	Butner Road	812922	McFayden Pond Overflow	(2) 55 (1) 55	50 50	6.9 m (22 ft 7 in) long; 14.0 m (46 ft) wide; roadway width 13.4 m (44 ft)	Unlimited vertical; 6.9 m (22 ft 7 in) horizontal.	Deck; Reinforced concrete	Good	
9	Plank Road	706800	Puppy Creek	(2) 120 (1) 120	90 90	9.7 m (31 ft 9 in) long; 11.6 m (38 ft) wide; roadway width 7.3 m (24 ft)	Unlimited vertical; 10.7 m (35 ft) horizontal.	Deck; Reinforced concrete	Good	
10	Unnamed Road to Lobelia	653957	Little River	(1) 40	30	26.9 m (88 ft 4 in) long; 3.4 m (11 ft 3 in) wide; roadway width 3.2 m (10.5 ft)	Unlimited vertical; 3.4 m (11 ft 3 in) horizontal.	Deck; Treated Timber with steel stringers	Fair	No lateral bracing
11	McKeller's Road	777923	McPherson Creek	(2) 60 (1) 60	80 80	5.7 m (18 ft 9 in) long; 10.4 m (34 ft 2 in) wide; roadway width 7.1 m (23 ft 3 in)	Unlimited vertical; 9.6 m (31 ft 8 in) horizontal.	Deck; Reinforced concrete	Good	

2. RAILROADS

IDENTI- FICATION NUMBER	SEGMENT OF TRACK (GRID REFERENCES)	LENGTH OF SEGMENT	OWNERSHIP OF LINE AND CONDITION OF TRACK	CHARACTERISTICS OF TRACKS	SIDING	BALLAST MATERIAL	VOLUME OF TRAFFIC	FACILITIES	REMARKS
Line 1	857873 to 818929	44.37 km (27.57 mi) Including Sidings	U.S. Government; poor to excellent	Single track standard gage (1.44 m or 4 ft 8 1/2 in) Weight of rails varies; 30.62 kg or 34.02 kg or 36.29 kg (67.5 lb or 75 lb or 80 lb or 85 lb)	Numerous sidings over 1 km (5/8 mi.) 1.794905 to 824909 2.821920 to 855918 3.844897 to 842915	Varies; A.R.E.A. #4; sand; regular stone	Approximately 200 cars/month	Fuel points at 841898 Station house at 837920	Tracks on post operated by Cape Fear Railway, 81 switches, treated crossies, in past traffic has been as much as 430 cars/month
Line 2	803821 to 791836			Single track standard gage (1.44 m or 4 ft 8 1/2 in) In ammunition area, 38.56 kg (85 lb)					

3. AIRFIELDS/AIRSTRIPS

One major airfield and 21 airstrips exist on the Fort Bragg Military Reservation. Simmons Army Airfield, located east of the cantonment area, provides service for military aircraft as well as its mission assigned aircraft. Navigational aids are provided for instrument operations. The airfield has an operational capability to serve aircraft up to and including C-130E Hercules on

a restricted basis. There are weight restrictions on various access and apron areas. Most of the airstrips on Fort Bragg are not maintained due to infrequent use and are classified as nonoperational. The airstrips that are operational usually require upgrading before use and some are occasionally upgraded during Engineer training exercises.

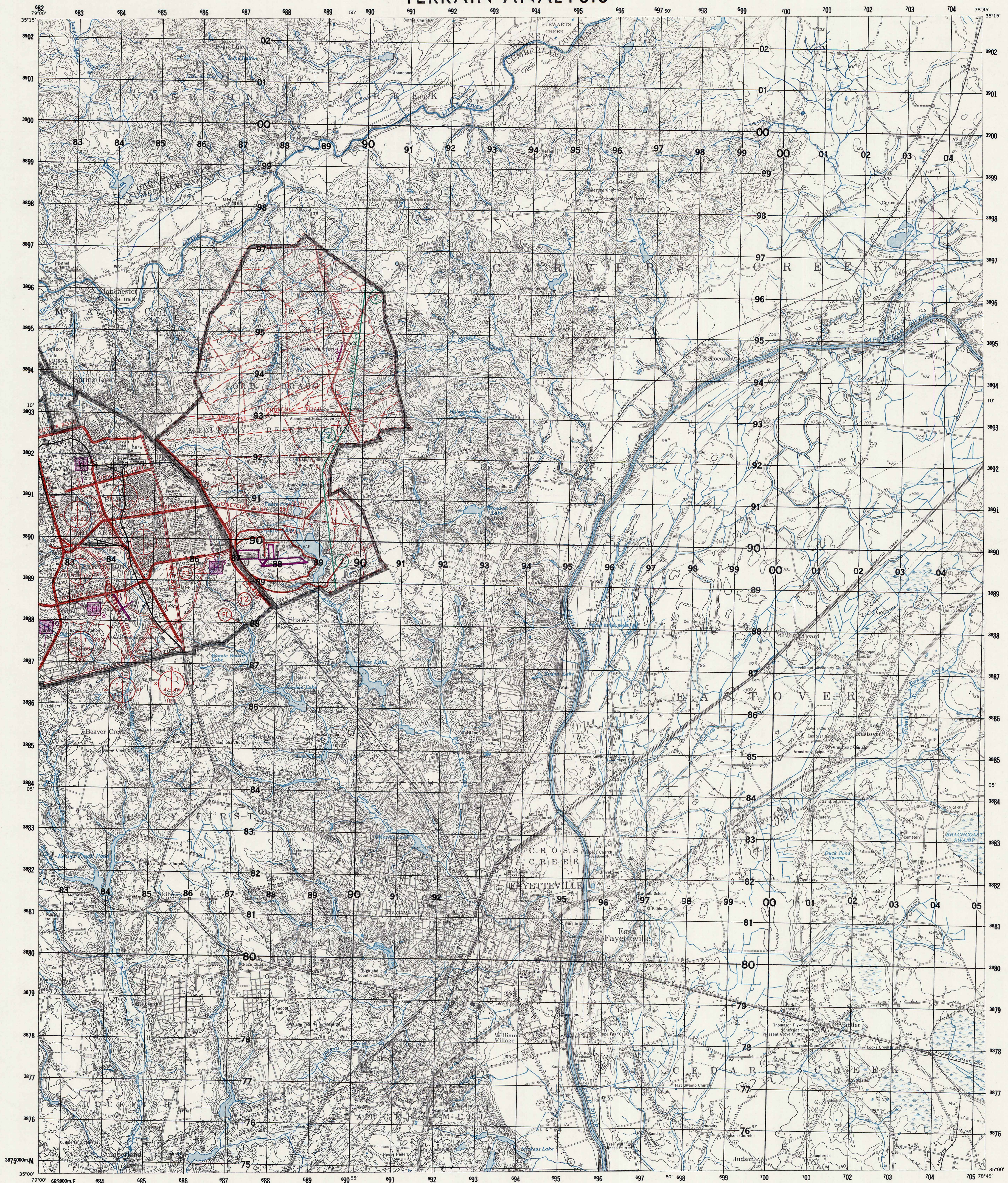
MAP NUMBER AND/OR NAME: LOCATION: TYPE: AND CLASSIFICATION	ELEVATION AND STATUS	RUNWAY DESCRIPTION	TAXIWAY, PARKING, APRON, AND HARDSTAND AREA DESCRIPTION	BUILDING DESCRIPTION	POL FACILITIES	NAVIGATIONAL AIDS	REMARKS
1; Simmons Army Airfield; grid reference 881895; Army; Airfield	73.8 m (242 ft) Operational	Runway: 1097.3 m long; 30.5 m wide (3600 ft long; 100 ft wide); Az 090°-270°; maximum weight bearing capacity-S 21, T 36, asphaltic concrete surface in good condition.	Three taxiways: 147.8 m x 30.5 m (485 ft x 100 ft); 144.8 m x 30.5 m (475 ft x 100 ft); 178.3 m x 30.5 m (585 ft x 100 ft); asphaltic concrete in good condition. Two parking aprons totaling 130,524 sq m (1,405,000 sq ft) weight bearing capacity same as runway, asphaltic concrete surface in good condition; hardstand area totaling 7432 sq m (80,000 sq ft), concrete surface in fair condition.	Nine hangars: 110 m x 37 m (362 ft x 121 ft) 98 m x 25 m (323 ft x 82 ft) 48 m x 39 m (159 ft x 130 ft) 39 m x 30 m (127 ft x 100 ft) 49 m x 40 m (160 ft x 131 ft) 49 m x 39 m (160 ft x 130 ft) 48 m x 41 m (159 ft x 131 ft) 39 m x 30 m (127 ft x 100 ft) 32 m x 19 m (104 ft x 61 ft) Steel frame construction or concrete block; Seven maintenance bldgs: 22 m x 16 m (73 ft x 52 ft) 32 m x 8 m (105 ft x 26 ft) 36 m x 5 m (119 ft x 17 ft) 46 m x 8 m (150 ft x 26 ft) 46 m x 8 m (150 ft x 26 ft) 45 m x 8 m (149 ft x 25 ft) 36 m x 5 m (119 ft x 17 ft) Steel frame or concrete block; 10 Administrative bldgs: *80 sq m (864 sq ft) *47 sq m (510 sq ft) *595 sq m (6400 sq ft) *417 sq m (4489 sq ft) *209 sq m (2250 sq ft) *209 sq m (2250 sq ft) *105 sq m (1125 sq ft) *209 sq m (2250 sq ft) *105 sq m (1125 sq ft) *445 sq m (4788 sq ft) Concrete block; One Terminal Building; *257 sq m (2765 sq ft) Concrete block; *indicates FLOOR SPACE Metric measurements are rounded off to the nearest meter.	Single point refueling; grades of fuel: U.S. Aviation fuel (M11-SPECS) 115/145, (2400 gpm); JP-4, (3600 gpm); under- ground storage capacity 165,000 gal; oil and grease for turbine engines.	Control tower, 73.8 m (242 ft) above sea level and 8.5 m (28 ft) high. Omnidirectional Range (VOR-VHF) instrument landing system; Non-directional Radio Beacon (NDB); Precision Approach Radar (PAR). Lights: rotating beacon approach lights; high intensity runway and approach lights; obstruction lights.	
2; Smoke Bomb Hill; FLS 1; grid reference 844883; Army; Airstrip	73.2 m (240 ft); Non- Operational	670.6 m long x 15.2 m wide (2200 ft long x 50 ft wide); Az 150° - 330°; 366 m long x 12 m wide (1200 ft long x 40 ft wide); Az 050° - 230°; Compacted sand both runways.					18 m (60 ft) buildings west end of R/W 15, 50 ft trees north end of R/W 05.
3; Neda; FLS 2; grid reference 892943; Army; Airstrip	97.5 m (320 ft); Non- Operational	366 m long x 4.6 m wide (1200 ft long x 15 ft wide); Az 020° - 220°; Compacted clay.					15 m (50 ft) trees at each end of strip.
4; Brown, FLS 3; grid reference 816874; Army; Airstrip	103.6 m (340 ft); Non- Operational	975.4 m long x 24.4 m wide (3200 ft long x 80 ft wide); Az 100° - 280°; 609.6 m long x 24.4 m wide (2000 ft long x 80 ft wide); Az 150° - 330°.					9 m (30 ft) trees each end.
5; Pioneer, FLS 6; grid reference 757914; Army; Airstrip	97.5 m (320 ft); Non- Operational	366 m long x 12 m wide (1200 ft long x 40 ft wide); Az 060° - 240°; Soft sand.					15 m (50 ft) trees on all sides.
6; OP-3, FLS 7 grid reference 787865 Army; Airstrip	94.5 m (310 ft); Non- Operational	366 m long x 12 m wide (1200 ft long x 30 ft wide); Az 160° - 340°; Compacted clay.					15 m (50 ft) trees each end.
7; Latham, FLS 10; grid reference 725897; Army; Airstrip	112.8 m (370 ft); Non- Operational	554.7 m long x 15.2 m wide (1820 ft long x 50 ft wide); Az 070° - 250°; Compacted clay.					Single tree south edge of strip.
8; North Sicily, FLS 12; grid reference 696918; Air Force; Airstrip	100.0 m (328 ft); Operational	1066.8 m long x 18.3 m wide (3500 ft long x 60 ft wide); Az 049° - 229°; CBR 20+; Compacted clay	1170.4 m long x 10.9 m wide (3840 ft long x 36 ft wide), turn radii 21 m (70 ft).			(1) Tower, 090°; 2.8 NM @ 61 m (200 ft) AGL (2) Coleman Danger Area, 230°, 2 NM.	Clear zones 05/91 m (300 ft); 23/157 m (500 ft). Approach area 46 m (50 yds) RT of RT lane to 46 m (50 yds) LF of LF lane centering extending out 1100 m (1200 yds) from approach end of impact zone, Coleman Danger Area, 2.7 NM off departure end located within DZ No. 6.
9; Castle, FLS 13; grid reference 668795; Army; Airstrip	106.7 m (350 ft); Non- Operational	713.2 m long x 36.6 m wide (2340 ft long x 120 ft wide); Az 110° - 290°; 475.5 m long x 27.4 m wide (1560 ft long x 90 ft wide); Az 180° - 360°; Compacted clay both strips.					18 m (60 ft) trees on all sides within 15 m (50 ft) from edge of runways.
10; South Sicily, FLS 14; grid reference 687886; Army; Airstrip	112.8 m (370 ft); Non- Operational	713.2 m long x 21.3 m wide (2340 ft long x 70 ft wide); Az 060° - 240°; Compacted clay.					Located within DZ No. 6.
11; Little Engineer, FLS 16; grid reference 688923; Army; Airstrip	94.5 m (310 ft); Non- Operational	536.4 m long x 21.3 m wide (1760 ft long x 70 ft wide); Az 010° - 190°; Compacted clay.					12 m (40 ft) trees on all sides.
12; Campbell Cross- roads; FLS 17; grid reference 611843; Army; Airstrip	124.9 m (410 ft); Non- Operational	713.2 m long x 27.4 m wide (2340 ft long x 90 ft wide); Az 180° - 360°; Compacted clay.					21 m (70 ft) trees on north end of runway.
13; Falcon, FLS 18; grid reference 673912; Army; Airstrip	88.4 m (290 ft); Non- Operational	1109.5 m long x 45.7 m wide (3640 ft long x 150 ft wide); Az 065° - 245°; 475.5 m long x 18.3 m wide (1560 ft long x 60 ft wide); Az 065° - 245°; Compacted clay.					
14; White Cloud, FLS 19; grid reference 576833; Army; Airstrip	106.7 m (350 ft); Non- Operational	981.5 m long x 21.3 m wide (3220 ft long x 70 ft wide); Az 127° - 307°					
15; Inverness, FLS 20; grid reference 605940; Army; Airstrip	106.7 m (350 ft); Non- Operational	713.2 m long x 18.3 m wide (2340 ft long x 60 ft wide); Az 100° - 280°; 554.7 m long x 15.2 m wide (1820 ft long x 50 ft wide); Az 180° -360°; Soft sand.					15 m (50 ft) trees on all sides.
16; Normandy, FLS 22; grid reference 642896; Army; Airstrip	124.9 m (410 ft); Non- Operational	981.5 m long x 45.7 m wide (3220 ft long x 150 ft wide); Az 090° - 270°.	792.5 m long x 30.5 m wide (2600 ft long x 100 ft wide), Az 090° - 270°;				
17; Nijmegen, FLS 23; grid reference 520851; Army; Airstrip	143.9 m (472 ft); Non- Operational	777.2 m long x 18.2 m wide (2550 ft long x 60 ft wide); Az 092° - 272°; Compacted clay - Sand. Approval for C-130 Type II, C7A Type III, Recommend fill and compaction at 09 end before use, C-130 not approved due to insufficient length.	911.9 m long x 10.9 m wide (2992 ft long x 36 ft wide); Turn radii 21 m (70 ft); Compacted clay.				Trees 17 m (55 ft) in height obstructions both ends of airstrip. Located within DZ No. 2.

3. AIRFIELDS/AIRSTRIPS (CONTINUED)

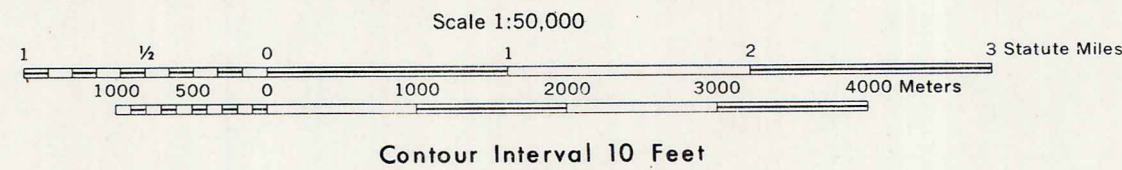
MAP NUMBER AND/OR NAME; LOCATION; TYPE; AND CLASSIFICATION	ELEVATION AND STATUS	RUNWAY DESCRIPTION	TAXIWAY, PARKING, APRON, AND HARDBAND AREA DESCRIPTION	BUILDING DESCRIPTION	POL FACILITIES	NAVIGATIONAL AIDS	REMARKS
18; Holland, FLS 24; grid reference 548913; Air Force; Airstrip	141.7 m (465 ft); Operational	1066.8 m long x 18.2 m wide (3500 ft long x 60 ft wide); Az 249° - 069°; Compacted clay.	1066.8 m long x 10.9 m wide (3500 ft long x 36 ft wide); turn radii 21 m (70 ft); Compacted clay.				Located within DZ No. 1.
19; South Holland, FLS 26; grid reference 542870; Army; Airstrip	109.7 m (360 ft); Operational	792.5 m long x 10.7 m wide (2600 ft long x 35 ft wide); Az 017° - 197°; Compacted clay.					Recommend repair of wash outs north end of strip before use.
20; St. Mere Englise FLS 9; grid reference 722809; Army; Airstrip	83.8 m (275 ft); Operational	929.6 m long x 18.2 m wide (3050 ft long x 60 ft wide); Az 035° - 215°; Compacted clay.	868.7 m long x 14.0 m wide (2850 ft long x 46 ft wide); turn radii 21 m (70 ft); Compacted clay.				Trees 271 m (890 ft) from R/W 21, McRidge Danger Area 030°, 0.2 NM Coleman Danger Area 032°, 0.7 NM Located within DZ No. 4.
21; FLS 21; grid reference 542829; Army; Airstrip	106.7 m (350 ft); Non- Operational	749.8 m long x 18.2 m wide (2460 ft long x 60 ft wide); Az 017° - 197°;					15 m (50 ft) trees around both ends of airstrip.
22; Holland New, grid reference 556917; Army; Airstrip	158.9 m (520 ft); Operational	1097.3 m long x 18.3 m wide (3600 ft long x 60 ft wide); Az 063° - 243°; Compacted clay.	850.0 m long x 10.9 m wide (2789 ft long x 36 ft wide); Compacted clay.				Located within DZ No. 1.

NOTE: Runway weight bearing capacity in pounds (gross weight of aircraft) is determined by adding 000 to figure following S, T, ST, TT, TDT. Runway weight bearing capacity given is for unlimited operations. Aircraft weight higher than given requires prior permission from aerodrome controlling authority.
S - Runway weight bearing capacity for aircraft with single-wheel type landing gear (C-47, F100).
T - Runway weight bearing capacity for aircraft with twin-wheel type landing gear (C-9A).
ST - Runway weight bearing capacity for aircraft with single-tandem landing gear (C-130).
TT - Runway weight bearing capacity for aircraft with twin-tandem type (includes quadricycle) landing gear (B-52, C-135).
TDT - Runway weight bearing capacity for aircraft with twin-delta tandem landing gear (C-5).

For further information, see "DOD Flight Information Publication (enroute IFR-Supplement United States).

FORT BRAGG, NORTH CAROLINA
TERRAIN ANALYSIS

Cartographic and reproduction support provided by the 63D Engineer Company (Topographic) (Corps), Ft. Bragg, North Carolina 28307. November, 1977



Prepared by the 283D Engineer Detachment (Terrain) under the direction of the Terrain Analysis Center, US Army Engineer Topographic Laboratories, Ft. Belvoir, Virginia, 22060.

INDEX TO ADJOINING SHEETS

5154 I	5254 IV	5254 I
5154 II	5254 III	5254 II
5154 III	5254 IV	5254 I

Sheet 5254 III falls within N17-2, V501, 1:250,000

ROADS

- Hard Surface divided, 4 or more lanes
- Hard Surface, 4 or more lanes
- Hard Surface, 2 or 3 lanes
- Hard Surface, 1 lane
- Improved Dirt
- Unimproved Dirt
- Tank Trail
- State Route Marker
- Grade

BRIDGE DATA

- (all measurements in meters)
- A Bridge number
 - B One way Military load class
 - C Two way Military load class
 - D Roadway width
 - E Length
 - F Overhead clearance
 - ∞ Unlimited vertical clearance
 - T Track vehicle

RAILROADS

- Railroad
- FORDS
- Ford

TANK CROSSINGS

- Tank Crossing

AIRFIELDS/AIRSTRIPS

- Airfield
- Airstrip

HELICOPTER LANDING ZONES

- Landing Zone

DROP ZONES

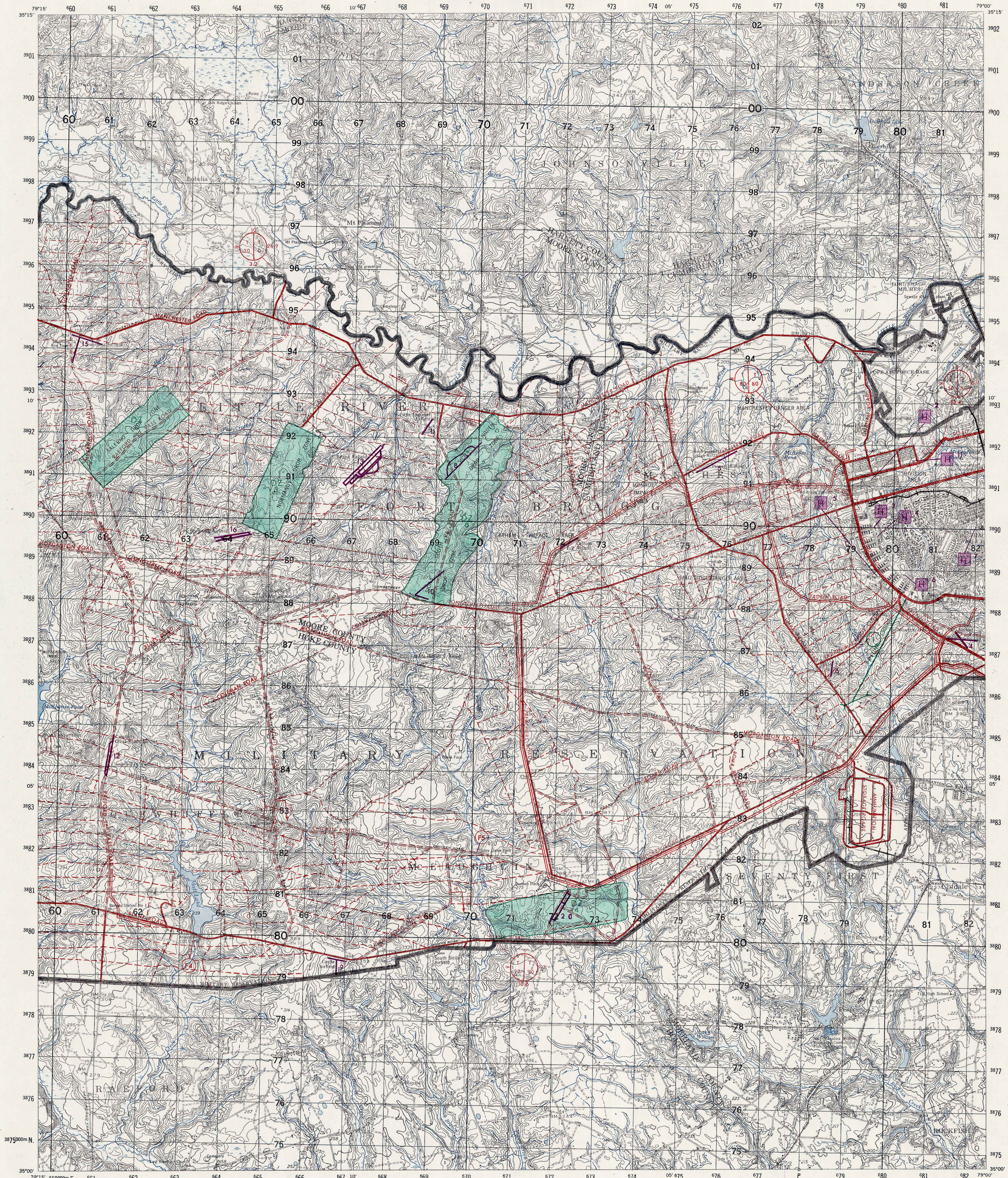
- Drop Zones

PIPELINES

- Pipeline

NOTE: Numbers on map refers to entries in table.

FORT BRAGG, NORTH CAROLINA TERRAIN ANALYSIS



Cartographic and reproduction support provided by the 63D Engineer Company (Topographic) (Corps), Ft. Bragg, North Carolina 28307. November, 1977

Scale 1:50,000
1 1/2 0 1 2 3 Statute Miles
1000 500 0 1000 2000 3000 4000 Meters

Prepared by the 283D Engineer Detachment (Terrain) under the direction of the Terrain Analysis Center, US Army Engineer Topographic Laboratories, Ft. Belvoir, Virginia, 22060.

ADJOINING SHEETS

5154 IV	5154 I	5254 IV
5154 VI	5154 II	5254 III
5153 IV	5153 I	5253 IV

Sheet 5154 II falls within NI 17.5, V901, 1:250,000

LINE OF COMMUNICATION

- ROADS**
- Hard Surface divided, 4 or more lanes
 - Hard Surface, 4 or more lanes
 - Hard Surface, 2 or 3 lanes
 - Hard Surface, 1 lane
 - Improved Dirt
 - Unimproved Dirt
 - Tank Trail
 - State Route Marker
 - Grade

- BRIDGE DATA**
(all measurements in meters)
- A Bridge number
 - B One way Military load class
 - C Two way Military load class
 - D Roadway width
 - E Length
 - F Overhead clearance
 - ∞ Unlimited vertical clearance
 - T Track vehicle

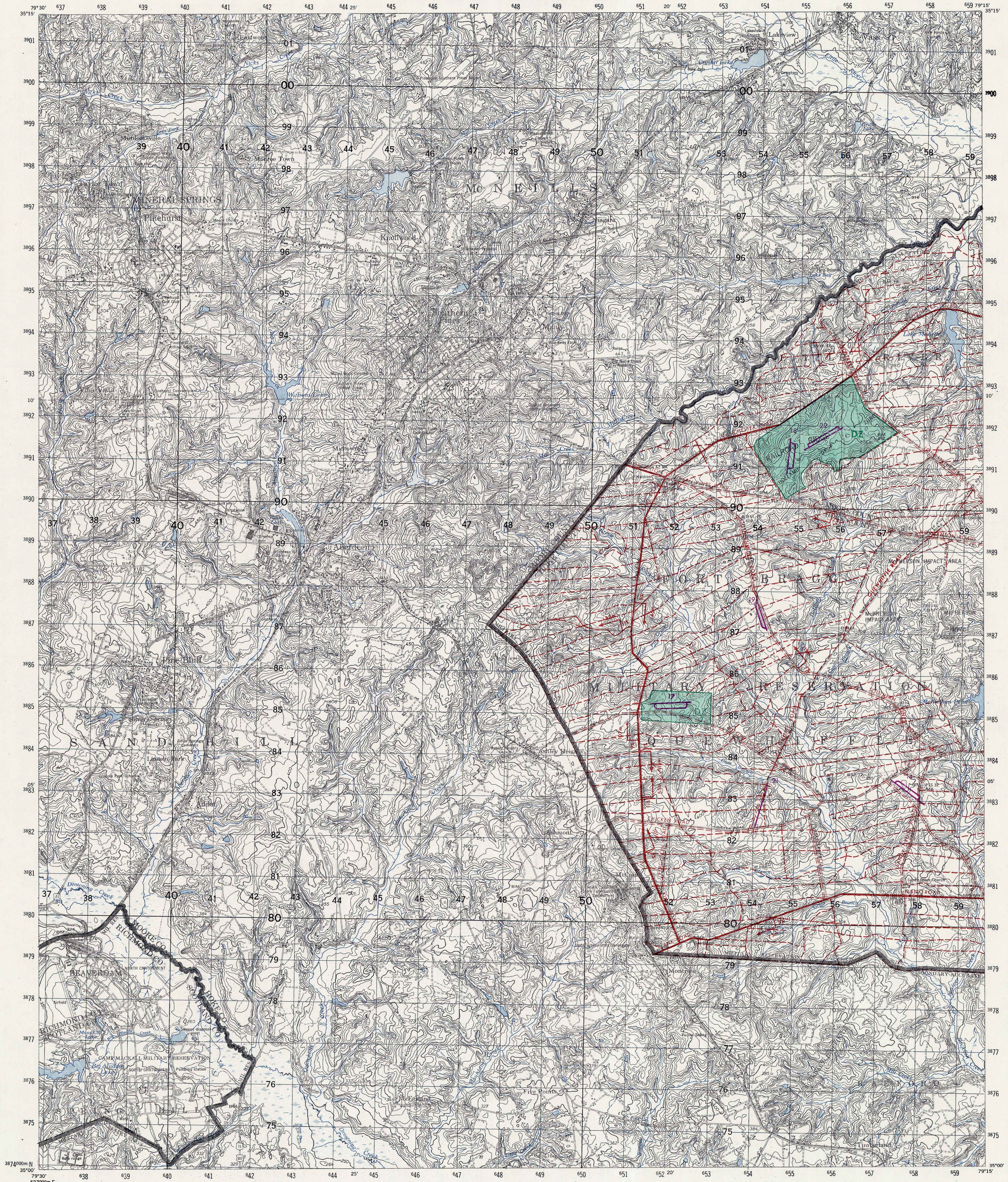
- RAILROADS**
- Railroad
- FORDS**
- Ford
- TANK CROSSINGS**
- Tank Crossing

- AIRFIELDS/AIRSTRIPS**
- Airfield
 - Airstrip

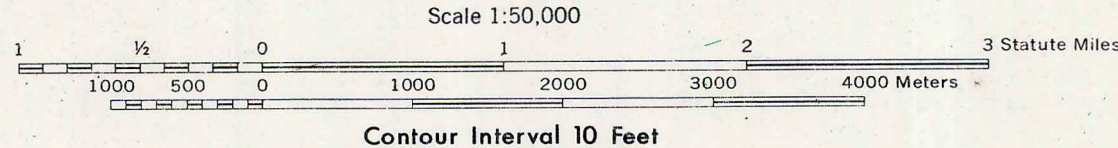
- HELICOPTER LANDING ZONES**
- Landing Zone
- DROP ZONES**
- Drop Zones
- PIPELINES**
- Pipeline

NOTE: Numbers on map refers to entries in table.

FORT BRAGG, NORTH CAROLINA TERRAIN ANALYSIS



Cartographic and reproduction support provided by the 63D Engineer Company (Topographic) (Corps), Ft. Bragg, North Carolina 28307. November, 1977



Prepared by the 283D Engineer Detachment (Terrain) under the direction of the Terrain Analysis Center, US Army Engineer Topographic Laboratories, Ft. Belvoir, Virginia, 22060.

INDEX TO ADJOINING SHEETS

5054 I	5154 IV	5154 I
5054 II	5154 V	5154 II
5053 I	5153 IV	5153 I

Sheet 5154 III falls within N 17-3, V501, 1:250,000

- ROADS**
- Hard Surface divided, 4 or more lanes
 - Hard Surface, 4 or more lanes
 - Hard Surface, 2 or 3 lanes
 - Hard Surface, 1 lane
 - Improved Dirt
 - Unimproved Dirt
 - Tank Trail
 - State Route Marker
 - Grade



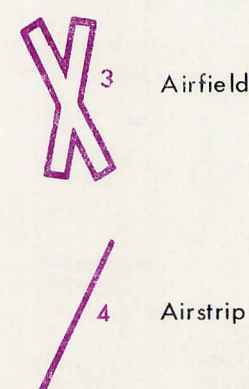
- BRIDGE DATA**
(all measurements in meters)
- A Bridge number
 - B One way Military load class
 - C Two way Military load class
 - D Roadway width
 - E Length
 - F Overhead clearance
 - Unlimited vertical clearance
 - T Tank vehicle

- RAILROADS**
- Railroad

- FORDS**
- Ford

- TANK CROSSINGS**
- Tank Crossing

- AIRFIELDS/AIRSTRIPS**



- HELICOPTER LANDING ZONES**

- Landing Zone

- DROP ZONES**



- PIPELINES**

- Pipeline

NOTE: Numbers on map refers to entries in table.

K. URBAN AREAS (CANTONMENT AREA)

TROOP BILLETS			
TYPE	CAPACITY	CURRENT LOAD	REMARKS
PERMANENT Adequate SSMBMA*	16,681+ 11,171 5,510	13,214 10,026 3,188	Of the total number of 31,512 spaces, 5,873 have been diverted to administrative uses.
TEMPORARY Sub-Standard	14,831	7,764	By 1990 permanent spaces will include an additional 1896 spaces currently under construction in Area H. Some temporary spaces may have been destroyed.
TOTAL	31,512	20,978	
*Sub-Standard, May Be Made Adequate			
+Number of spaces based on a living area of 90 sq ft			

QUARTERS					
TYPE	AREA	TOTAL NUMBER	CAPACITY	CONDITION	REMARKS
Officer Quarters		990 Qtrs			
	Normandy	163	18-4BR; 145-3BR	Good	All quarters are currently occupied. Waiting list from 1 to 6 months depending upon rank and size of quarters.
	Hammond Hills	507	A11 3BR	Good	
	Yadkin	320	280-4BR; 40-3BR	Excellent	
Bachelor Officer Quarters	*	10 Bldgs	716 Spaces		
		2	275 ea.	Excellent	BOQ occupancy is currently 110% to 120% of design capacity.
		1	30	Good	
		1	40	Good	
		1	16	Good	
		5	16 ea.	Good	
Enlisted Quarters		3852* Qtrs			
	Bastogne	128	121-3BR; 7-2BR	Good	All quarters are currently occupied. Waiting list from 1 to 12 months dependent upon rank.
	Hammond Hills	1568	A11 3BR	Good	
	Ardennes	150	60-4BR; 90-2BR	Good	
	Bataan	156	62-4BR; 94-3BR	Good	
	Anzio Acres	766	150-3BR; 616-2BR	Good	Substandard and size of quarters.
		156	78-4BR; 78-3BR	Substandard	
	Corregidor	772	150-3BR, 622-2BR	Good	
		Courts	152	76-4BR, 76-3BR	Substandard
	*Includes 4 Game Warden houses not in the cantonment area				
Bachelor Enlisted Quarters		22 Bldgs	395 Spaces		
	ATC Area	9	154	Fair(Substandard)	Average occupancy is 95%
	Main Post	7	134	Fair(Substandard)	
	COSCOM Area	6	107	Fair(Substandard)	
Guest Quarters	Normandy House		20 Rooms	Excellent	Reserved for visiting dignitaries, LT GEN and above
			16 Cottages	Excellent	
	Delmont House		75 Rooms	Excellent	
	Leal House		24 Rooms	Excellent	
	Sink House		1 House	Excellent	

RECREATION FACILITIES		
TYPE	NUMBER	REMARKS
Stadium	1	Hedrick Stadium, 2460 seats, lighted.
Tennis Courts	18	Based on troop population, 36 additional courts required.
Multi-purpose Courts	3	Based on troop population, 10 additional courts required.
Basketball Courts	13	Based on troop population, 27 additional courts required.
General Playgrounds	74	64 in Family housing area, postwide; 5 at elementary schools, postwide, 1 at McFayden's Pond; 1 at McKellar's Lodge; 1 at Irwin Junior High School; 1 at Smith Lake Recreation Area; 1 at Child Care Center (post nursery); Based on troop population, 3 additional playgrounds required and programmed.
Volleyball Courts	1	Based on troop population, 119 additional courts required and to be constructed by local projects.
Baseball Fields	5	All lighted
Junior Baseball Fields	4	1 at Bowley School; 3 at Butner and Murray School; all lighted; based on troop population, 22 additional fields required.
Softball Fields	19	Based on troop population, 11 additional fields required.
Football Fields	2	
Running Tracks	6	
Wading Pools	2	1 each at Officers and NCO Clubs.
Swimming Pools	10	Based on troop population, 5 additional pools required.
		Outdoor 8
		Indoor 2
Bowling Center	3	2 have 24 lanes, 1 has 12 lanes.
Automotive Self-Help Centers	3	
Physical Fitness Centers	1	Lee Field House
Skating Rink	1	Located next to Lee Field House.
Golf Courses With Club Houses	2	Officer's Club Golf Course and Club House; Stryker Golf Course and Club House.
Gymnasium	3	2 permanent and 1 temporary; based on troop population, a total of 7 gymnasiums are required.
Library	3	1 branch main post, used as main library; 1 branch Womack Hospital, 1 branch 82d DIV.
Theater	4	3 Indoor, 1 drive-in.
Riding Stables	1	50 stalls.
Indoor Handball/Squash Courts	4	Towle Courts
Boxing and Wrestling Ring	4	3 permanent, 1 each at Lee, Tucker, and Hoskings Field Houses; 1 temporary (built 1918); based on troop population, 8 additional rings required.
Rod and Gun Club	1	Mc Kellars Lodge, 2 skeet ranges and one 100 m rifle range.
Miniature Golf Course	2	
Arts and Crafts Center	1	

SCHOOLS AND HOSPITALS			
SCHOOLS	CAPACITY	CURRENT ENROLLMENT	Remarks
Kindergarten	720	671*	The kindergarten/nursery is now housed in temporary facilities, part of the old hospital complex.
Elementary Schools	775	734	Proposed (not planned) expansion of school system would relocate kindergarten classrooms into elementary schools, demolish and replace Bowley, and build new schools in Hammond Hills, Spring Lake area, and Yadkin area.
Bowley			
Butner			
Holbrook			
McNair			
Murray			
Jr High School Irwin	875	725*	
High School			Students attend Fayetteville City Schools
*Includes pupils from Pope AFB			
HOSPITAL	CAPACITY	REMARKS	
Womack Army Hospital	500 beds		The hospital chassis (i.e. laboratories, clinics, kitchen, and other facilities) is adequate for 500 additional beds, or 1000 beds total. Hospital serves Pope AFB as well as Fort Bragg
Dispensaries	6 with a total of 22,253 sq ft		6 dispensaries postwide with two additional planned, plus 14 temporary facilities.
Dental Clinics	3 with a total of 39,026 sq ft		1 each 28 chair clinic, 2 each 24 chair clinics, plus 7 chairs in Womack Army Hospital. One 78 chair clinic of 35,270 sq ft is planned.

UTILITIES			
TYPE	PRESENT CAPACITY	CURRENT LOAD (Peak demand FY 77)	REMARKS
1. Electric	50,000 KVA	60,941 KVA	Capacity of Carolina Power & Light Company owned substation. Power purchased from C P & L.
	1,973 KW	50% of capacity	Capacity of eight standby generator plants.
	130,734 KVA	1.07% of accepted	Capacity of Distribution Transformers postwide.
	20,000 KVA	15,588 KVA	Capacity of two electrical switching stations. Based on projected ultimate demand created by all known future construction, a total of 92,000 KV will be required.
2. Heating Plants	921.93 MBTU/hr.		Capacity of 20 heating plants postwide Based on requirement of 85 MCA projects committed for oil heat, an additional 235.33 MBTU's is required.
	Oil Fired	195.63 MBTU/hr.	
	Gas Fired	726.3 MBTU/hr.	Capacity of 11 plants postwide. Based on requirement of three MCA projects committed for gas heat, an additional 35 MBTU's is required. Based on projected ultimate demand created by all known future construction a total of 1192 MBTU's will be required.
3. Air Conditioning	21,110 tons	No data.	There are a total of 23 plants postwide with a capacity of greater than 25 tons and 35 plants less than 25 tons. Based on estimated tonnage for all known future construction a total of 26,800 tons is required
4. Natural Gas	444,436 MCF/yr.	444,436 MCF/yr.	Purchased from North Carolina Natural Gas. Used for family housing, troop billets, and BOQ 190,918 MCF sold to PX facilities, NAF activities and Pope AFB housing.
5. Sewage and Waste			
	Sewage Treatment Plant	6750 KG/day	Existing plant capacity with secondary treatment. Projected rehabilitation or new construction will give a total capacity of 8 million gallons with tertiary treatment for pollution control.
	Septic tank & Drain fields	27 fields	All less than 3660 GPD
			Aside from these drain fields and pit latrines in training areas, all of Ft. Bragg is connected to the post sanitary sewer system. Of these 27 fields none exceed 3660 gallons per day maximum output.
Note: Present planning includes the addition of an Industrial Waste Discharge facility and a Refuse Derived Fuel (RDF) processing facility. The post has one sanitary land fill with a capacity of 8228 tons per month.			
6. Water	Potable Supply	28-390 MGPD	Primary source is Little River. Flow range is based on 50 year records.
	Treatment Plant	10 MGPD	11.75 MGPD
	Elevated Storage Tanks	2 6 MG	There are five tanks with following capacities; one@ 1 MG, two@ .5 MG, two@ .3MG. 1971 study recommended construction of an additional one million gallon tank.
	Ground Storage Tanks	1.3 MG	One tank with 1.1 MG capacity and one with .2 MG capacity. 1971 study recommended addition of a .5 MG tank at Simmons AAF.
	Wells with pumping station	.397A MGPD	No data
	Raw water pumping station	11.536 MGPD	Raw water pumping station which feeds treatment plant.
	Treated water pumping station	34.128 MGPD	No data
	Water pipeline	1,916,594 LF	An additional 47,900 feet is required.
	Non-Potable Reservoirs	.575 MG	Two storage tanks at Simmons AAF one at 2 MG gallons and one at .375 MG.
	Wells	.792 MGPD	No data
7. Telecommunications			
	Class of Service	Maximum Lines Available Working	
	Total Lines	9600	8185
	Class "A" Autovon	1040	991
	Class "A" Non-Autovon	1840	1368
	Class "B" Unofficial	3840	3331
	Class "C" Official Restricted	2880	2495
	Total No. of Switches	5500	Step by step, Dial Exchange
	Manual Switchboard	1	10 position manual type board.
	Directory Assistance Board	1	Four position board
	Autovon switches	65 circuits	
	Outgoing city trunks	167 dial pulse repeaters	
	Incoming city trunks	140 selectors	
	Toll inward trunks	41	
	Inward FTS circuits	9	
	WATS circuits, outgoing	12	Six in North Carolina and six in Area Five
	Key systems installed	253	There are a total of 5060 instruments within these key systems.
	CT&T pay stations	325	
	Open wire pole lines	62 miles	
	Telephone poles	2945	Plus 2000 poles in joint use with Post Engineer
	Underground conduit	155,529 ft (29.5 miles)(47.5 km)	
	Lead sheath cable	592,738 ft (112.3 miles)(180.7 km)	
	Plastic sheath cable	4,346,800 ft (823.3 miles)(1325 km)	
Note: Abbreviations used in this section:			
FTS	- Federal Telecommunications System	MBTU	- Million British Thermal Units
GPD	- Gallons Per Day	MCF	- Million Cubic Feet
GPM	- Gallons Per Minute	MG	- Million Gallons
KV	- Kilovolts	MGPD	- Million Gallons Per Day
KVA	- Kilovolt-Amps	WATS	- Wide Area Telephone Service
KW	- Kilowatts		Unless otherwise indicated, the rate of consumption for all utilities is per day.
LF	- Linear Feet		

FORT BRAGG, NORTH CAROLINA TERRAIN ANALYSIS



URBAN AREAS
(CANTONMENT AREA)

Scale 1:14,000 (Approximate)

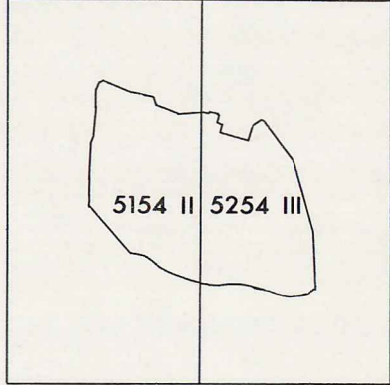
AREA FEATURES

- Family Housing, Officers
- Family Housing, NCO
- Barracks, Troop Quarters
- Bachelor Officer Quarters
- Bachelor Enlisted Quarters
- Guest House, Temporary Quarters
- Parade Grounds
- Outdoor Recreation Facilities

POINT FEATURES

- 1 Post Headquarters
- 2 Post Hospital
- 3 Officers Open Mess
- 4 Post Exchange
- 5 Commissary
- 6 Post Office
- 7 Elementary School
- 8 Chapel
- 9 Directorate of Facilities - Engineering
- 10 Telephone Exchange
- 11 Sewage Treatment Plant
- 12 Electric Power Substation
- 13 Flight Obstructions (Elevations Above Mean Sea Level)
- 14 Cemetery

LOCATION DIAGRAM

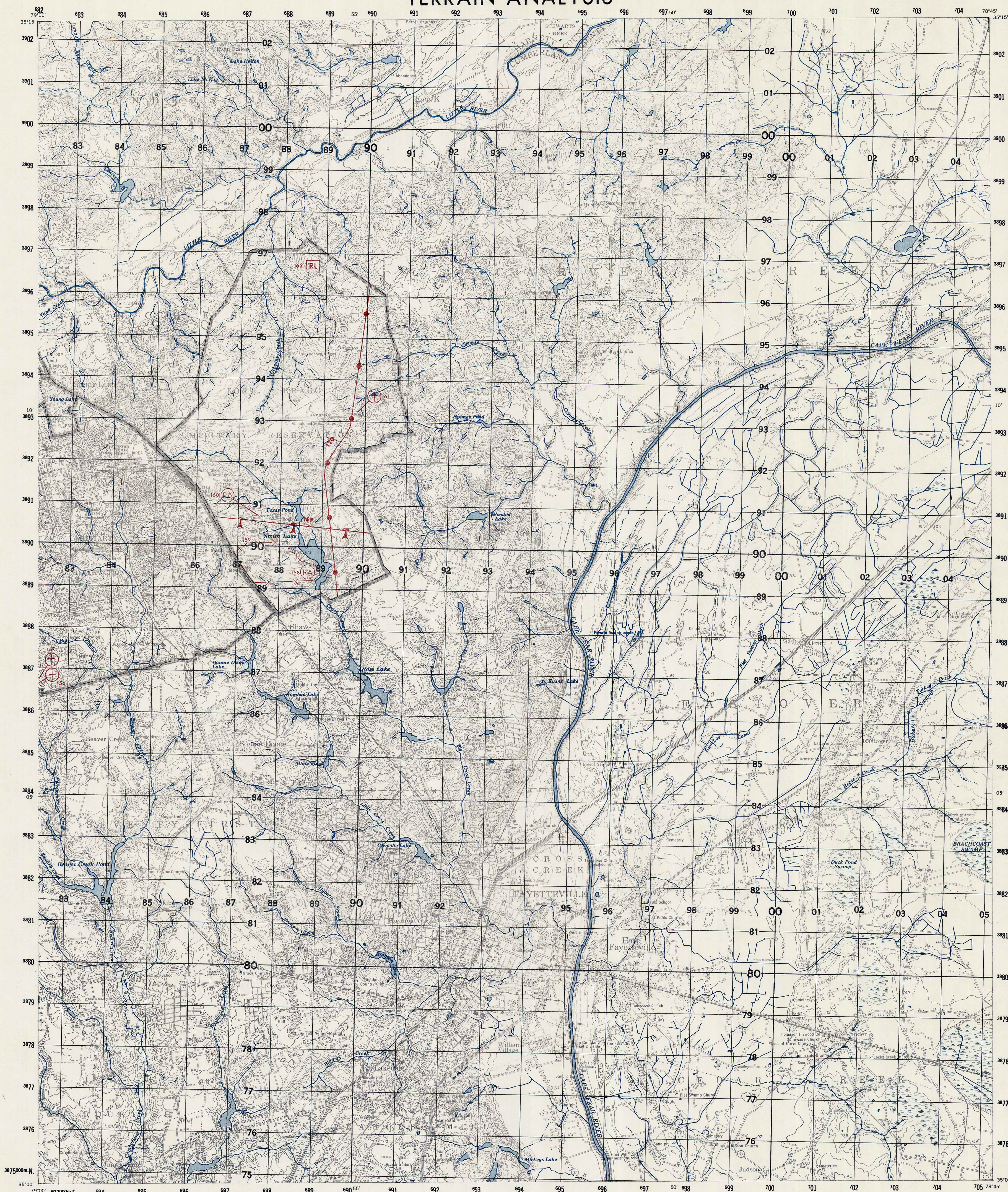


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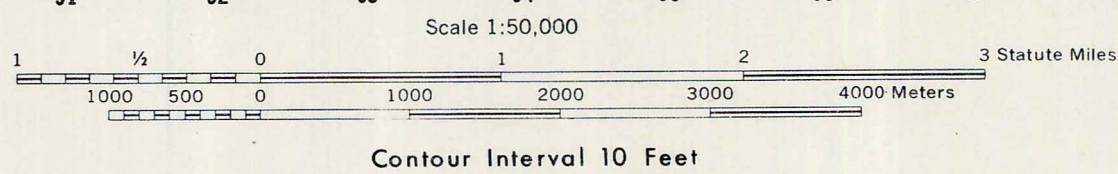
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NON-URBAN CULTURE FEATURES

MAP NUMBER	GRID REFERENCE	DESCRIPTION	MAP NUMBER	GRID REFERENCE	DESCRIPTION	MAP NUMBER	GRID REFERENCE	DESCRIPTION
1	483873	6 radio towers; each approximately 25m (80ft.) in height.	56	692915	Bleachers for Sicily Drop Zone demonstration area.	106	795832	10 ft. chain link fence around Ammunition Storage Facility.
	483874		57	713880	Longstreet Church.	107	801838	McIntyre Cemetery; approximately 20 graves.
	484675		58	-712879	Longstreet Cemetery; approximately 150 graves.	108	796849	Ellis Cemetery; approximately 18 graves.
	483876					109	785844	Ammunition Truck holding area.
	484877		59	704873	Two earth covered wooden dugouts for artillery observation.	110	786847	Thomas Cemetery; approximately 9 graves.
	485876		60	703875	OP 8 - Two dugouts (ref No. 59) on flank of OP.	111	783849	Probable old burial site, presently under investigation by Facilities Engineer.
2	490873	5th Special Forces Aberdeen Signal Site, 12 buildings.	61	709869	OP 8A - No permanent features.	112	793858	Nuclear Weapons Support Branch; one building.
3	490873	8ft. chain link fence enclosing Aberdeen Signal Site.	62	711863	Bleachers and latrine facilities at OP 5.	113	793858	8 ft. chain link fence around Nuclear Weapons Support Branch.
4	495871	4 radio towers; each approximately 25m (80ft.) in height.	63	711863	OP 5 - Firepower Demonstrations.	114	817874	Brown Airfield (abandoned).
	495872		64	707856	Demolitions Storage bunker.	115	804880	Newton-Alderman Cemetery; approximately 50 graves.
	496871		65	707855	Bleachers for demolitions demonstrations.	116	783866	OP 3 - Concrete and steel-plate artillery observation bunker.
	496870		66	707855	Concrete observation bunker.	117	775879	OP 2A - Concrete artillery observation bunker.
5	500865	Lane burial site; single grave, 1km (0.6mi.) west of King Road down Firebreak 35.	67	712838	Range 65 - Inert rocket launcher and sub-caliber LAW, 6 points.	118	774880	OP 2 - No permanent features.
6	497844	Sawmill; semi-permanent no fixed buildings.	68	713832	Range 64 - HE rocket launcher and recoilless rifle, 5 points; one latrine.	119	782879	Nuclear, Biological and Chemical Warfare Range (inactive).
7	515909	Abandoned airstrip, FLS-28.	69	716828	Hadley Cemetery; approximately 10 graves.	120	793888	Recreational Area; motocross track.
8	518906	Ranger Station No. 2; 2 buildings.	70	715822	Control tower for Helicopter Range 63; approximate height 11m (35ft.).	121	788903	Power sub-station.
9	540923	Golins Cemetery, approximately 40 graves; 1.1km (0.7mi.) west off Manchester Road down Firebreak 15.	71	715821	Range 63 - Helicopter Attack Range (Pilot Gunner), one lane; one latrine.	122	789905	Range Control Headquarters building.
10	560940	3 buildings; Airborne Communications and Electronics (ACE) Board test site.	72	730830	Demolished artillery observation bunker.	123	775902	Sanitary Landfill.
11	561941	3 metal towers; each 9m (30ft.) in height with enclosed observation platforms. Associated with ACE Board test site.	73	715839	Range 66 - Aerial Target Range, Rifles and M60 MG; tower height 5m (15ft.), uncovered bleachers, one latrine, one cadre building, one storage building, one ammunition issue shed.	124	763900	Forestry Headquarters building and one 30m (100ft.) fire tower.
	561939		74	721853	Storage quonset hut.	125	758895	Two historical markers commemorating General Cornwallis' march through the area.
	564940		75	721858	OP 9 - no permanent features.	126	745900	Fish and Wildlife Headquarters building and 37m (120ft.) radio tower.
12	593964	McLeod Cemetery; approximately 40 graves.	76	720863	OP 7 - no permanent features.	127	756906	23m (75ft.) radio tower.
13	590899	OP-13 - No permanent features.	77	717866	Two dugouts constructed of timbers, logs, and ammo boxes. Used as artillery firing positions.	128	776922	McKellars Lodge Fish and Wildlife Association; one club house, one ammunition storage building, two small storage buildings, playground with recreation equipment, dog kennels.
14	545812	McDonald Cemetery; approximately 25 graves, 1.3km (0.8mi.) west of Turkey Road down Firebreak 65.	78	718878	Range 26 - Combat Firing, 1 squad; tower height 5m (18ft.), covered bleachers, one cadre building, one storage building, one latrine.	129	775923	Game Warden Headquarters; one building.
15	527794	Sanitary fill area in old borrow pit.	79	729884	Range 27 - Close Combat, 5 lanes; tower height 5m (15ft.), covered bleachers, one storage building, one latrine.	130	776924	Two skeet ranges.
16	577808	Sandy Grove Church.	80	729885	Confidence Course.	131	774923	100m rifle range (recreational).
17	578808	Sandy Grove Cemetery; approximately 150 graves.	81	733885	Range 28 - Individual Night Fire, 110 points; tower height 5m (15ft.), three sets of covered bleachers, one storage building, one latrine.	132	769922	Range 25 - HE Rocket Launcher, 4 points.
18	612805	Resident Inspector, Timber Harvesting; one building, one house trailer, surrounded by 8ft. chain link fence.	82	736886	Range 29 - Inactive.	133	764921	Range 24 - 40mm Grenade Launcher, 6 lanes; one latrine.
19	613805	Ranger Station No. 1; two buildings.	83	739887	Range 30 - Trainfire 1, Fieldfire, 35 points; tower height 5m (17ft.), covered bleachers, storage building, one latrine. (inactive)	134	762920	Range 23 - 40mm Grenade Launcher, 6 lanes.
20	615805	4 strand barbed wire fence around 7th Special Forces, Mott Lake Signal Site.	84	744889	Range 31 - Trainfire 1, 25m, 110 points; tower height 5m (17ft.), covered bleachers, one storage building, one latrine.	135	747923	Range 20 - Nuclear, Biological, and Chemical Warfare School Demonstration Range; tower height 7m (24ft.), 3 sets of covered bleachers, one latrine.
21	617813	5 radio towers approximately 25m (80ft.) in height.	85	747890	Range 32 - Sniper Training, 3 lanes; 5 covered firing positions.	136	746926	Range 19 - Shotgun range, 20 points.
	618811		86	752891	Range 33 - Trainfire 1, Recordfire, 16 lanes; tower height 5m (15ft.), covered bleachers, one storage building, one latrine.	137	757941	Range 16 - Submachinegun (dismounted), one course; one latrine.
	619810		87	758893	Range 34 - Trainfire 1, Fieldfire, 35 points; tower height 5m (15ft.), covered bleachers, one storage building, one latrine.	138	759941	Range 15 - Pistol and Rifle (Air Force), 18 points; one storage building.
	619813		88	762892	Range 35 - Trainfire 1, 25 meters, 110 points; tower height 5m (15ft.), covered bleachers, one storage building, one latrine.	139	761942	Range 14 - Pistol, Tables I thru XI, 4 sub-ranges A thru D, total 45 points; one storage building, one latrine.
	620812		89	771887	Range 36 - Inactive.	140	762943	Range 13 - .22 cal (50ft.) and Shotgun, 25 points;
22	617815	Radio tower approximately 45m (150ft.) in height.	90	772884	Range 37 - Inactive.	141	778944	Range 10 - Rifle and Pistol, 25 and 50 meters, 20 points, (150 meter Familiarization, 10 points); covered firing points.
23	623809	6ft. chain link fence enclosing Signal Site.	91	773880	Range 40 - Trainfire 1, 25 meters, 110 points; tower height 5m (15ft.), covered bleachers, one storage building, one latrine.	142	779942	Range 9 - Machinegun and Rifle, 10 and 25 meter, 65 points; tower height 5m (15ft.), uncovered bleachers, one storage building.
24	624810	4 buildings; 7th Special Forces, Mott Lake Signal Site.	92	774877	Range 41 - Trainfire 1, 25 meters, 65 points; tower height 5m (15ft.), one storage building, one latrine.	143	770940	Range 8 - Machinegun Transition, 6 lanes; tower height 5m (15ft.), one latrine.
25	599844	McKethan Cemetery; approximately 20 graves.	93	775874	Range 42 - Trainfire 1, Fieldfire, 35 points; tower height 5m (15ft.), covered bleachers, one storage building, one latrine.	144	782939	Range 7 - Competition Pistol, 40 points; covered bleachers, two classrooms, two storage buildings, one latrine, covered firing points.
26	608846	OP 17 - no permanent features.	94	779870	Range 43 - Trainfire 1, Recordfire, 16 lanes; tower height 5m (15ft.), covered bleachers, one storage building, one latrine.	145	788936	Range 6 - Fragmentation Hand Grenade, 4 bays; one observation bunker, one ammunition storage shed, one latrine.
27	609841	Campbell Cemetery; approximately 6 graves.	95	783864	Range 44 - Multiple Weapons Familiarization, .45 cal thru 105mm HOW, Direct Fire; covered bleachers, one latrine.	146	793933	Range 5 - Competition Rifle, 100 thru 600 yards, 30 points; one storage building, one latrine, range equipped with target pits.
28	611851	OP 16A - no permanent features.	96	778838	Range 50 - Trainfire 1, 25 meters, 110 points; tower height 5m (15ft.), covered bleachers, one storage building, one latrine.	147	794931	Range 4 - (inactive); one latrine.
29	609855	OP 16 - no permanent features.	97	773836	Range 51 - Artillery Simulator 14.5mm; one storage building.	148	794929	Range 3 - Tank Tables I, II, III and sub-caliber LAW, 10 points; equipped with target pits.
30	617853	Range tower for Range 79; height 10m (33ft.).	98	770835	Range 52 - Trainfire 1, 25 meters and Individual Night Fire, 110 points; tower height 5m (15ft.), covered bleachers, one storage building, one latrine.	149	796922	Instrument Landing System for Pope Air Force Base; one building.
31	629853	Smith Cemetery; approximately 6 graves.	99	768833	Range 53 - Machinegun Transition, 6 lanes (construction to be completed summer '77).	150	809923	Nuclear, Biological, and Chemical Warfare training area and CS gas chambers; covered bleachers, 10 test stations, vehicle decontamination practice area.
32	616856	Air Control Tower for helicopter range 78; height 15m (50ft.).	100	761831	Range 55 - Trainfire 1, Record Fire, 16 lanes; tower height 5m (15ft.), covered bleachers, one storage building, one latrine.	151	787938	Heavy Drop Rigging Site; one large building surrounded by 8ft. chain link fence.
33	616857	Range 78 - Helicopter Attack Range.	101	756828	Range 56 - Trainfire 1, Record Fire, 16 lanes; tower height 5m (15ft.), one storage building, one latrine.	152	790939	Memorial marker for SGT W. H. Juechter.
34	618854	Range 79 - Armored Recon Assault Vehicle, tables 4 thru 8; tables III thru IX for 106mm RR (mtd) and TOW missile (Inert).	102	749824	Range 57 - Trainfire 1, Field Fire, 35 points; tower height 5m (15ft.), covered bleachers, one storage building, one latrine.	153	798942	Power sub-station.
35	607877	OP 15 - no permanent features.	103	747823	Range 58 - Inactive.	154	799943	Ft Bragg Water Purification Plant; two buildings, one 500,000 gal holding tank, two 1,000,000 gal. holding tanks. Design capacity 10.75 million gallons/day.
36	601899	OP 14 - no permanent features.	104	750816	Military Burial site; 2 unknown soldiers.	155	813955	Ft Bragg Sewage Disposal Plant; one building four primary clarifiers, two filters, four secondary clarifiers, two sludge digesters, 10 sludge drying beds. Average rate 6.5 million gallons/day.
37	602942	Inverness Fire Tower; height 18m (60ft.).	105	795832	Ammunition Storage Facility; 33 large ammo bunkers plus many smaller facilities.	156	823866	Animal and Pet Cemetery (no longer used).
38	633953	Recondo School Demolition Range.				157	823867	Whitehead burial site; two graves.
39	634954	Recondo School Rappelling Tower; height 17m (55ft.).				158	892893	Smith Lake Recreational Area.
40	635955	Recondo School buildings; 1 classroom; 1 dispensary, 1 cadre office, 1 operations building, 2 Butler building barracks, 2 mobile homes used as offices and billets, 1 supply/dayroom, 1 storage building. Includes obstacle course and confidence course.				159	880895	Fence surrounding Simmons Army Airfield.
41	654946	Ranger Station No. 3; 2 buildings.				160	874907	Recreational Area; motocross track.
42	632879	2 Military Cemeteries each with 9 unknown soldiers.				161	899932	McKay Cemetery; six graves.
43	633880	3 Military Cemeteries each with 1 unknown soldier.				162	888967	NCO Academy Range - 35mm sub-caliber LAW and 14.5 artillery simulator; tower height 4m (14ft.), one latrine.
	635880							
	634875							
44	641881	Range 77 - Squad Attack (fire and maneuver).						
45	648881	OP 11 - concrete observation bunker.						
46	651879	Range 76 - Squad and Platoon Attack (fire and maneuver); one latrine building.						
47	658884	Gaddy Cemetery; approximately 18 graves.						
48	636854	2 mobile tank target mounted on sunken railroad tracks. Part of Range 79.						
	640854							
49	642839	Utley Cemetery; North off Chicken Road on dirt road, 2.7km (1.7mi.) east of Campbell's Crossroads.						
50	650800	Fire tower; height 18m (60ft.).						
51	658810	Concrete ruins; appears to be demolished firing range.						
52	668829	Range 83 - Helicopter Door Gunner Range, 1 lane; range tower height 12m (38ft.).						
53	674881	Range 74 - Tank Tables I, II, III; 5 vehicles.						
54	683878	OP 12 - remnants of old infiltration course.						
55	691915	Latrine facilities for Sicily Drop Zone demonstration area.						



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Prepared by the 283D Engineer Detachment (Terrain) under the direction of the Terrain Analysis Center, US Army Engineer Topographic Laboratories, Ft. Belvoir, Virginia, 22060.

INDEX TO ADJOINING SHEETS		
5154 I	5254 IV	5354 I
5154 II	5254 III	5354 II
5154 III	5254 IV	5354 III

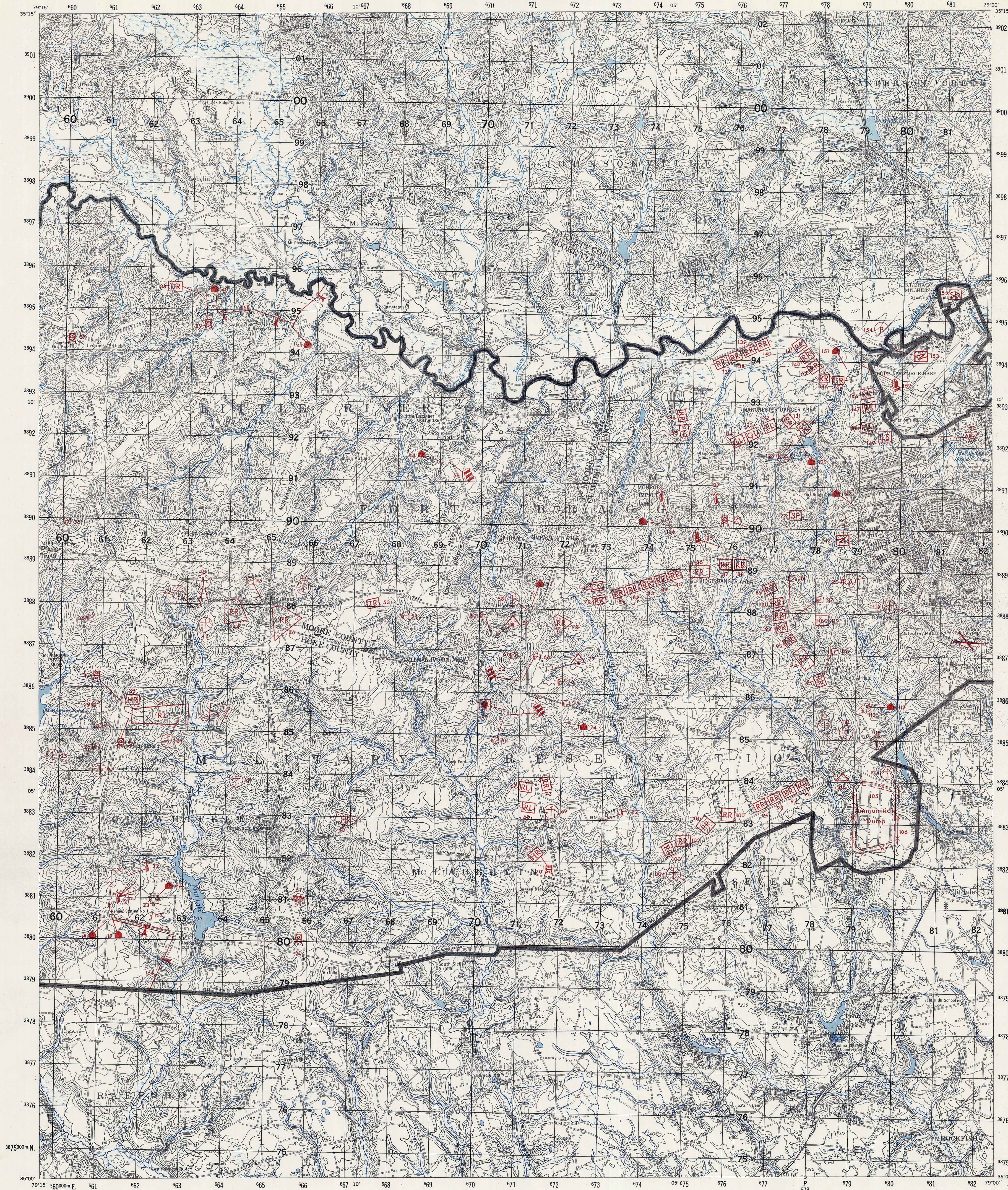
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NON-URBAN CULTURE FEATURES

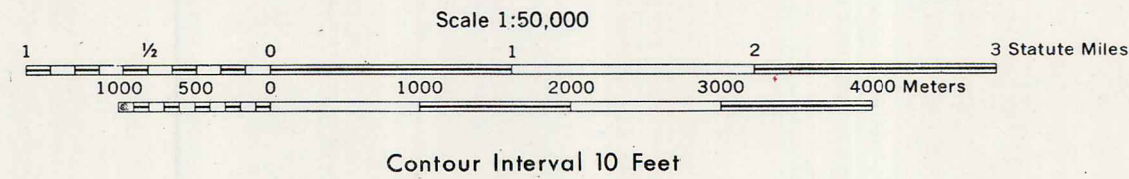
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|------------------------------|-------------------------|------------------------|------------------------|
| Towers; Lookout, Guard, Fire | Pumping Station | Abandoned Airfield | Rifle Range |
| Radio Tower | Recreation Area | Ammunition Dump | Skeet Range |
| Building(s) | Ammunition Bunker | Fence | Grenade Range |
| Monument | Bleachers, Permanent | Moving Target | Grenade Launcher Range |
| Ruins | Dugout | Power Line | Demolition Range |
| Sanitary Fill | Gas Chamber | Underground Power Line | NBC Range |
| Sewage Disposal Plant | Observation Post/Bunker | Underground Pipeline | Rocket Launcher Range |
| Power Substation | Cemetery | Helicopter Range | Tank Range |
| Confidence Course | Sawmill | | |
| Instrument Landing System | Storage Area | | |

GENERAL NOTES

1. Number on map refers to entry in table.
2. Cantonment area not evaluated.
3. Features appearing on base map that are not portrayed in the study no longer exist.

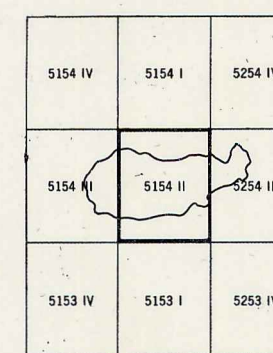


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Prepared by the 283D Engineer Detachment (Terrain) under the direction of the Terrain Analysis Center, US Army Engineer Topographic Laboratories, Ft. Belvoir, Virginia, 22060.

ADJOINING SHEETS



Sheet 5154 II falls within NT 17-3, V501, 1:250,000

NON-URBAN CULTURE FEATURES

- Towers; Lookout, Guard, Fire
- Radio Tower
- Building(s)
- Monument
- Ruins
- Sanitary Fill
- Sewage Disposal Plant
- Power Substation
- Confidence Course
- Instrument Landing System

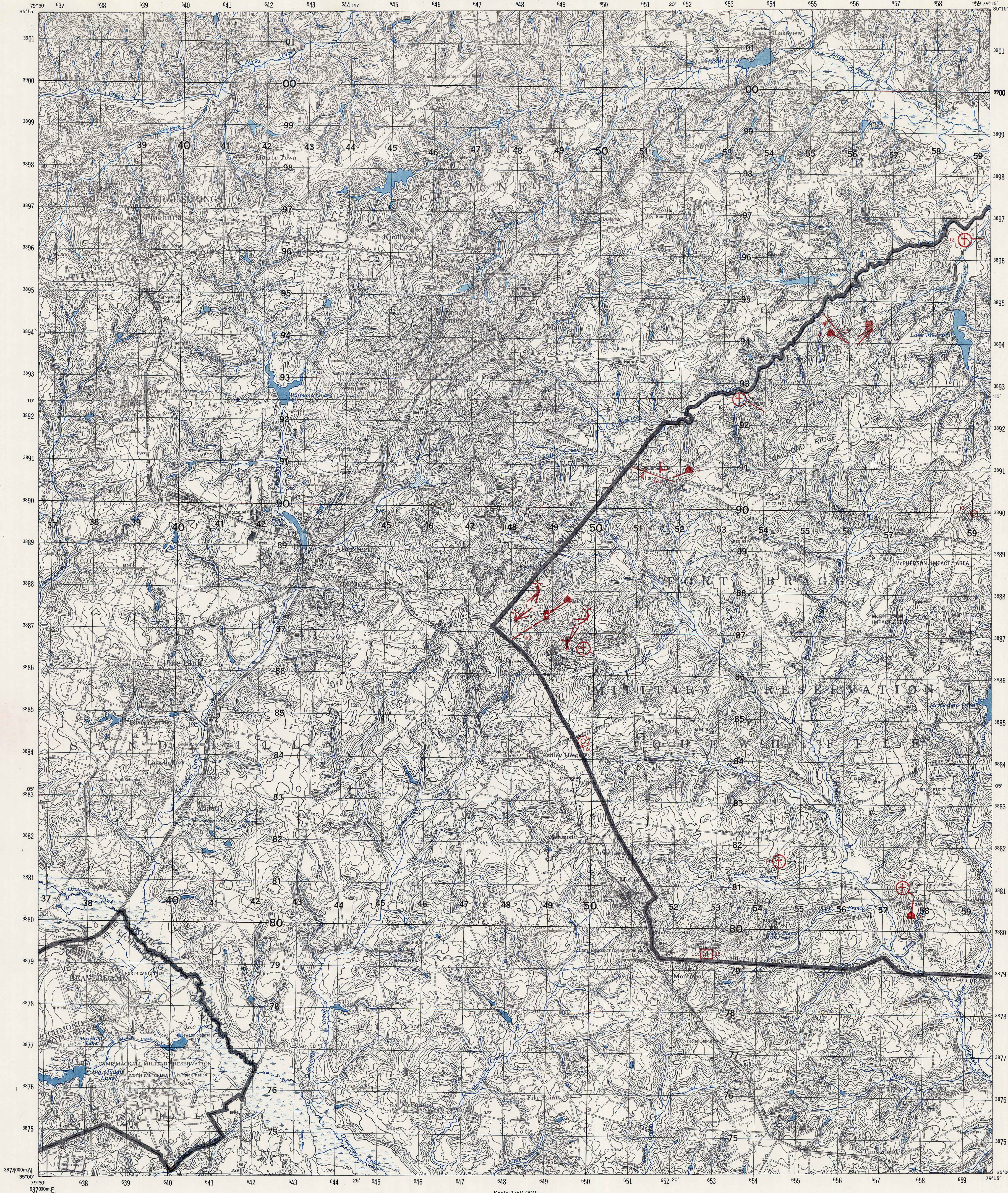
- Pumping Station
- Recreation Area
- Ammunition Bunker
- Bleachers, Permanent
- Dugout
- Gas Chamber
- Observation Post/Bunker
- Cemetery
- Sawmill
- Storage Area

- Abandoned Airfield
- Ammunition Dump
- Fence
- Moving Target
- Power Line
- Underground Power Line
- Underground Pipeline
- Helicopter Range

- Rifle Range
- Skeet Range
- Grenade Range
- Grenade Launcher Range
- Demolition Range
- NBC Range
- Rocket Launcher Range
- Tank Range

GENERAL NOTES

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Scale 1:50,000
1 0 1 2 3 Statute Miles
1000 500 0 1000 2000 3000 4000 Meters
Contour Interval 10 Feet

Prepared by the 283D Engineer Detachment (Terrain) under the direction of the Terrain Analysis Center, US Army Engineer Topographic Laboratories, Ft. Belvoir, Virginia, 22060.

INDEX TO ADJOINING SHEETS

5054 I	5154 IV	5154 I
5054 II	5154 III	5154 II
5053 I	5153 IV	5153 I

Sheet 5154 III falls within MI 17-3, V501, 1:250,000

NON-URBAN CULTURE FEATURES

- Towers; Lookout, Guard, Fire
- Radio Tower
- Building(s)
- Monument
- Ruins
- Sanitary Fill
- Sewage Disposal Plant
- Power Substation
- Confidence Course
- Instrument Landing System

- Pumping Station
- Recreation Area
- Ammunition Bunker
- Bleachers, Permanent
- Dugout
- Gas Chamber
- Observation Post/Bunker
- Cemetery
- Sawmill
- Storage Area

- Abandoned Airfield
- Ammunition Dump
- Fence
- Moving Target
- Power Line
- Underground Power Line
- Underground Pipeline
- Helicopter Range

- Rifle Range
- Skeet Range
- Grenade Range
- Grenade Launcher Range
- Demolition Range
- NBC Range
- Rocket Launcher Range
- Tank Range

GENERAL NOTES

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III. OFF POST FEATURES

A. AIRFIELDS

For the purpose of this study, Off Post Features addresses three areas; urban areas within 50 miles of the center of the cantonment area and a population greater than 2,500, Airfields, within 50 miles of the center of the cantonment area and capable of supporting cargo/troop transport aircraft (civil or military) equivalent to the C-130 Hercules (max. gross wt.=124,000 lbs.) or larger, and deep water ports within 100 miles of the center of the cantonment area.

There are 23 urban areas in this section ranging in population from approximately 3,000 to 150,000. Data was gathered through letters sent to the mayors of the various cities and, where feasible, through personal investigation.

There are three airfields capable of supporting sustained heavy air traffic; the civilian fields at Fayetteville and Raleigh, and Pope AFB. The minimum criteria for these fields is a capability to support aircraft with a twin wheel or single tandem landing gear configuration weighing 124,000 lbs. or more.

Data was extracted from DOD Flight Information Publications and through personal contact when feasible. Although 60 miles from post and outside the limits of this study, Seymour Johnson AFB is larger than Pope AFB and has greater capability.

The port of Wilmington is the only major port within the study area. It is an estuarine port, little affected by tides with a maximum draft capability of 38 feet and no width restrictions. Although it is administered primarily by the North Carolina Ports Authority, there are also several smaller private facilities. There are relatively good road and rail routes between the port and the reservation and the Cape Fear River is navigable to barge traffic as far as Fayetteville. In addition, farther down the estuary is the Sunny Point Army Terminal which is an ammunition transfer and storage facility and therefore, not covered in this study.

MAP NUMBER AND/OR NAME LOCATION; TYPE; AND CLASSIFICATION	ELEVATION AND STATUS	RUNWAY DESCRIPTION	TAXIWAY, PARKING APRON AND HARDSTAND AREA DESCRIPTION	BUILDING DESCRIPTION	POL FACILITIES	NAVIGATIONAL AIDS	REMARKS
1 Raleigh-Durham, Grid reference QK 002723 Civil; Airfield	133 m (436 ft) Operational	Longest runway: 2,287 m (7,500 ft) long, 46 m (150 ft) wide; Azimuth, 049°-229°; Runway weight bearing capacity: S-135, T-175, TT-285. Asphalt surface in good condition. Runway 2: 1,372 m (4,500 ft) long, 46 m (150 ft) wide; Azimuth, 139°-319°; Runway weight bearing capacity: same as longest runway. Asphalt surface in good condition.	Taxiways: width 23 m (75 ft); Weight bearing capacity same as runways; Asphalt surface. Parking, apron, and hardstand total areas unknown. Room for approximately 15 commercial aircraft plus private craft. Weight bearing capacity same as runways; Asphalt surface.	Airport hds five hangars, each with approximately 1,394 m ² (15,000 ft ²) of floor space.	Grades of fuel: 100/130, Jet Fuel ASTM type A, 80/87 and 100/130, Jet Fuel ASTM type A-1 without icing inhibitor. Airport authority is capable of storing 80,000 gallons. In addition there are two small private suppliers.	Control tower 150 m (493 ft) above sea level; BVORTAC RDU 117.2 channel 119, 32° 52' 20" N 78° 47' 01" W at field; Leesville non-directional beacon (H-SAB), LE350, 35° 55' 77" N 78° 43' 21" W, 229°, 4.0 NM to field. Apex LOM, RD 382, 35° 47' 48" N 78° 52' 59" W, 049°, 5.8 NM to field. UHF/VHF/DF and ILS available. Lighting-rotating beacon, runway or strip lights, high intensity runway and approach lights, sequenced flashing lights, Visual Approach Slope Indicator System.	
2 Fayetteville Municipal, Grannis Field, Grid reference PJ 932732 Civil; Airfield	58 m (189 ft) Operational	Longest runway: 1,982 m (6,500 ft) long, 46 m (150 ft) wide; Azimuth, 035°-215°; Runway weight bearing capacity: S-95, T-190, TT-410. Asphalt surface in excellent condition. Runway 2: 1,464 m (4,800 ft) long, 46 m (150 ft) wide; Azimuth, 095°-275°; Runway weight bearing capacity: T-55. Asphalt in good condition.	Taxiways: width 18 m (60 ft); Weight bearing capacity same as longest runway; Asphalt surface. Parking apron and hardstand area 58,064 m ² (625,000 ft ²). Weight bearing capacity same as longest runway; Asphalt surface.	Airport has two hangars, 24 m x 30 m (80 ft x 100 ft) and 18 m x 24 m (60 ft x 80 ft) with concrete floors and metal walls and roof. There is one terminal/administration building with 2,787 m ² (30,000 ft ²) of floor space. Additionally there is a two stall fire station and a 12 m x 18 m (40 ft x 60 ft) general maintenance building.	Grades of fuel: 80/87 and 100/130 Jet Fuel ASTM type A-1 without icing inhibitor. Storage capacity: Jet Fuel - 60,000 gallons; Avgas - 18,000 gallons. Dispensing capacity: three 5,000 gallon Jet Fuel, two 2,000 gallon and one 400 gallon Avgas tankers.	Control tower 77 m (254 ft) above sea level; BVOR FAY 108.8, 34° 59' 07" N 78° 52' 31" W at field, normal anticipated interference-free service 40 NM up to 18,000 ft MSL. Compass locator station GR 367, 34° 54' 44" N 78° 56' 24" W, 035° 5.1 NM to field. ILS with surveillance radar. High intensity runway lights on longest runway, medium intensity runway lights on runway 2, high intensity approach lights and sequenced flashing lights.	
3 Pope AFB, Grid reference PJ 807936 Air Force; Airbase.	66 m (218 ft) Operational	Longest runway: 2,287 m (7,500 ft) long, 46 m (150 ft) wide; Azimuth, 045°-225°; Runway weight bearing capacity: S-66, T-155, TT-334, TDT-68. Asphalt in good condition. Runway 2: 1,082 m (3,550 ft) long, 18 m (60 ft) wide; Azimuth, 046°-226°; Runway weight bearing capacity assault loaded C-130 aircraft only. Asphalt in good condition.	Taxiways: widths vary from 15 m (50 ft) to 46 m (150 ft); Weight bearing capacities vary from 61,236 kg (135,000 lb) to UNLIMITED. Taxiway surfaces are either asphalt or concrete. Total parking area is 594,560 m ² (6,400,000 ft ²). Weight bearing capacities vary from 158,759 kg (350,000 lb) to UNLIMITED. Apron surfaces are either asphalt or concrete.	Airbase has one hangar 76 m x 76 m (250 ft x 250 ft) plus offsets with total area of 6,221 m ² (66,965 ft ²), concrete floor and foundation, concrete masonry walls, and 5-ply built up roof; one maintenance facility (nose dock) 21 m x 47 m (69 ft x 155 ft) plus offset with total area of 1,374 m ² (14,788 ft ²); five maintenance facilities (nose dock) 21 m x 47 m x 15 m (69 ft x 155 ft x 50 ft) plus offsets each having a total area of 1,062 m ² (11,428 ft ²). All have concrete foundation and floor with metal walls and roof. One terminal building 102 m x 38 m (333.5 ft x 124 ft) plus wings and offsets with total area of 932 m ² (10,033 ft ²) has concrete floor, tile stucco walls, and metal and asphalt roof. One aircraft shop general purpose 81 m x 38 m (265 ft x 124 ft) with area of 3,052 m ² (32,860 ft ²) has concrete floor with metal walls and roof. Four warehouses of various sizes and construction having a total area of 7,477 m ² (80,481 ft ²). In addition there are numerous smaller buildings associated with base operations.	All organic fuel facilities are designed to handle JP-4 Jet Fuel, Avgas is available by truck from Simmons Army Airfield. There are fifty-four 600 GPM hydrants in the main parking apron. These are served by 3 operating pump houses each of which has six 50,000 gallon tanks below ground. There are 3 bulk storage tanks; one 10,000 BBL and two 20,000 BBL above ground. Four 25,000 gallon underground storage tanks are presently inactive. There are eleven tank car unloading connections and two truck fill stands. The base has ten 5,000 gallon fuel trucks.	Control tower 97 m (318 ft) above sea level; TACAN POB channel 85, 35° 09' 35" N 79° 01' 19" W at field, normal anticipated interference-free service 40 NM up to 18,000 feet MSL. TACAN unusable 140°-240° beyond 20 NM below 4,000 feet. Non-Directional Radio Beacon (Homing) less than 50 watts 25 NM without voice facilities. POB 338, 35° 13' 36" N 78° 57' 16" W, 225° 3.8 NM to field. ILS Localizer unusable beyond 50° either side of front course. Rotating beacon, high intensity runway and approach lights, sequenced flashing lights, Visual Approach Slope Indicator System.	Restricted air-space to south-west and west of field, Fort Bragg Military Reservation. Three taxiways have failed and will be upgraded.

Note: Runway weight bearing capacity (gross weight of aircraft) is determined by adding 000 to figure following S, T, ST, TT, TDT. Runway weight bearing capacity given is for unlimited operations. Aircraft weight higher than given requires prior permission from aerodrome controlling authority.

S - Runway weight bearing capacity for aircraft with single-wheel type landing gear) (C-47, F100).

T - Runway weight bearing capacity for aircraft with twin-wheel type landing gear (C-9A).

ST - Runway weight bearing capacity for aircraft with single-tandem landing gear (C-130).

TT - Runway weight bearing capacity for aircraft with twin-tandem type (includes quadricycle) landing gear (B-52, C-135).

TDT - Runway weight bearing capacity for aircraft with twin-delta tandem landing gear (C-5).

For further information, see DOD Flight Information Publication (enroute IFR-Supplement United States).

B. URBAN AREAS

NAME AND GRID REFERENCE	POPULATION	HOUSING AVAILABILITY	EDUCATION FACILITIES	RECREATION FACILITIES	UTILITIES AND FACILITIES
APEX, NC 35° 44' N 78° 51' W	Latest census, 1970; 2,192. Estimated current population; 3,060. Projected 1980; 3,896.	Total number of units; 838. Number renter occupied; 303. Number vacant year around; 25. Average number for sale; No data. Median price; No data. Average number for rent; No data. Median rent; No data.	Number of elementary schools; No data; enrollment, 1,019; total capacity, 1,175. 1 Intermediate school; enrollment, 424; total capacity, 1,000. 1 High school; enrollment, 525; total capacity, 700.	1 Park 1 Private organization swimming pool 1 Athletic field 6 Tennis courts	Water source: Reservior, water level meets current demand, no planned expansion. Sewerage: Aeration type, it is at capacity level at present, a 2 year program to pump to Raleigh is planned. Heating fuels: Oil-gas, meet current demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current peak loads, a 20 year program for expansion. Medical facilities: Western Wake Hospital, (25 beds); 4 doctors and 4 dentists.
Benson, NC 35° 23' N 78° 33' W	Latest census, 1 July 1975; 2,630. Estimated current population; 2,750. Projected 1980; 3,000.	Total number of units; 150. Number renter occupied; 150. Number vacant year around; 0. Average number for sale; 0. Average number for rent; 0. Median rent; \$73.00 per month.	1 Elementary/Intermediate school; enrollment, 520; total capacity, 600. 1 High school; enrollment, 1,202; total capacity, 1,300.	2 Parks 1 Swimming pool 4 Athletic fields 1 Tennis court	Water source: Town of Dunn and Benson City own wells, meets current demand, no planned expansion. Sewerage: Type, Lagoon, meets current demand, no planned expansion. Heating fuels: Oil-gas, meets current demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current peak loads, no planned expansion. Medical facilities: Johnson Memorial Hospital, (180 beds); 3 doctors and 4 dentists.
Cary, NC 35° 47' N 78° 47' W	Latest census, 1970; 14,970. Estimated current population; 17,000. Projected 1980; 22,460.	Total number of units; 5,263. Number renter occupied; 1,578. Number vacant year around; 210. Average number for sale; 150. Median price; No data. Average number for rent; 60. Median rent; \$200.00 per month, (2 bedroom).	5 Elementary schools; enrollment, 3,661. 1 Intermediate school; enrollment, 2,156. total capacity; No data. 1 High school; enrollment, 1,606; total capacity, No data.	4 Parks 4 Swimming pools 9 Athletic fields 10 Private tennis courts 7 Public tennis courts 1 Private Golf course	Water source: River-reservoir (contracted with Raleigh), meets current demand, no planned expansion. Sewerage: Contracted with Raleigh, meets current demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current peak loads, no planned expansion. Medical facilities: None; 11 doctors and 14 dentists.
Clayton, NC 35° 39' N 78° 28' W	Latest census, 1970; 4,091. Estimated current population; 4,250. Projected 1980; 5,000.	Total number of units; 1,304. Number renter occupied; 470. Number vacant year around; 6. Average number for sale; 5. Median price; \$30,000-\$35,000. Average number for rent; 4. Median rent; \$150.00 per month.	2 Elementary schools; enrollment, 1,064; total capacity, 1,325. 1 Intermediate school (grades 6-8); enrollment, 455, total capacity, 550. 1 High school; enrollment, 595; total capacity, 700.	1 Park 1 Swimming pool 4 Athletic fields 2 Tennis courts 2 Golf courses	Water source: Deep wells, meets current demand, planned expansion to connect town of Smithfield water plant by mid-1978. Sewerage: Trickler type system, capacity 1 mgd, no planned expansion. Heating fuels: Oil-gas, meets current demand, no planned expansion. Electricity: Clayton Electrical Department, meets current demand, constantly up-grading. Medical facilities: None; 2 doctors and 2 dentists.
Clinton, NC 35° 00' N 78° 19' W	Latest census, 1970; 7,147. Estimated current population; 8,480. Projected 1980; 9,100.	Total number of units; 1975, 2,639. Number renter occupied; 791. Number vacant year around; 75. Average number of sale; 10. Median price; \$30,000. Average number for rent; 4. Median rent; \$125.00 per month.	3 Elementary Schools; enrollment, 1,483; total capacity, 1,866. 1 Intermediate school; enrollment, 824; total capacity, 1,260. 1 High school; enrollment, 1,075; total capacity, 1,000.	6 Parks 1 Public swimming pool 2 Private swimming pools 8 Athletic fields 8 Public Tennis courts 6 Private tennis courts 1 Private golf course	Water source: 4 Deep wells, (city owned), meets current demands at 2.7 million gpd and 800,000 gal storage, planned expansion, new 600 GPM FY 77-78. Sewerage: Municipal high rate trickling filter with sludge digestion, meets current demand at 3 mgd capacity-average flow 2 mgd, planned expansion, up-grading filtering process. Heating fuels: Oil-gas, meets current demand. Electricity: Carolina Power and Light Company, meets current demands at peak loads. Medical facilities: Sampson County Memorial Hospital, (178 beds), 4 intensive care and coronary units; 25 doctors and 7 dentists.
Dunn, NC 35° 19' N 78° 37' W	Latest census, 1970; 8,302. Estimated current population; 9,200. Projected 1980; 10,400.	Total number of units; 3,100. Number renter occupied; 1,240. Number vacant year around; 20. Average number for sale; 10. Median price; \$30,000. Average number for rent; 10. Median rent; \$125.00 per month.	3 Elementary schools; enrollment, 985; total capacity, 900. 1 Intermediate school; enrollment, 1,067; total capacity, 1,000. 1 High school; enrollment, 866; total capacity, 700.	1 Park 2 Swimming pools 2 Athletic fields 4 Tennis courts 1 Golf course Additional facilities include: Civic center, handball, exercise rooms and meeting hall.	Water source: Cape Fear River, meets current demand, no planned expansion. Sewerage: Contact stabilization type, does not meet current demand, planned expansion, replacement of plant and up-grading of collection system. Heating fuels: Oil-gas, meets current demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current demand at peak loads. Medical facilities: Betsy Johnson Memorial Hospital, (117 beds), 1 intensive care and coronary unit; 16 doctors and 7 dentists.
Erwin, NC 35° 20' N 78° 41' W	Latest census, 1970; 2,852. Estimated current population; 3,100. Projected 1980; 3,300.	Total number of units; No data. Number renter occupied; 25. Number vacant year around; No data. Average number for sale; 8. Median price; \$24,000. Average number for rent; 8. Median rent; \$130.00 per month.	1 Elementary school; enrollment, 434; total capacity, 434. 1 Junior/senior high school; enrollment, 1,064; total capacity, No data.	2 Parks 3 Athletic fields 2 Tennis courts 1 Golf course Additional facilities: 2 All-purpose courts and community building.	Water source: City of Dunn water plant, meets current demand, no planned expansion. Sewerage: lype, unknown, no planned expansion. Heating fuels: Oil-gas, meets current demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current peak loads, no planned expansion. Medical facilities: Good Hope Hospital, (55 beds), 1 intensive care and coronary care unit, (2 beds); 2 doctors and 0 dentists.
Fayetteville, NC 35° 03' N 78° 54' W	Latest census, 1970; 212,042. Estimated current population; 242,021. Projected 1980; 256,036. population figures include Cumberland County.	Total number of units; 62,500. Number renter occupied; 27,058. Number vacant year around; 2,557. Average number for sale; 1,995. Median price; \$26,000. Average number for rent; 870. Median rent; \$185.00 per month.	5 Elementary schools; enrollment, 2,000; total capacity, No data. 2 Intermediate schools; enrollment, 2,200; total capacity, No data. 3 High schools; enrollment, 4,200; total capacity, No data. 4 Colleges; enrollment, 6,000; total capacity, No data.	65 Parks 19 Swimming pools 156 Athletic fields 104 Tennis courts 5 Golf courses Additional facilities: 554 of various types.	Water source: Cape Fear River, Big and Little Cross Creek, meets current demand, no planned expansion. Sewerage: Pure Oxygen Aeration type with Tertiary sand filters, meets current demand, no planned expansion. Heating fuels: Oil-gas, meets current demand, no planned expansion. Electricity: Carolina Power and Light Company with peak saving Gas Turbine Generation by Fayetteville Public Works Commision, meets current demand, No planned expansion. Medical facilities: Cape Fear Valley Hospital, (450 beds), 1 intensive care and coronary care unit; Highsmith Rainey Hospital, (98 beds), 1 intensive care and coronary care unit; Cumberland Pscychiatric Hospital, (40 beds); 104 doctors and 48 dentists.
Fuquay-Varina, NC 35° 35' N 78° 48' W	Latest census, 1970; 3,576. Estimated current population; 3,700. Projected 1980; No data.	Total number of units; 1,200. Number renter occupied; 40. Number vacant year around; 0. Average number for sale; 40. Median price; \$35,000-\$40,000. Average number for rent; 40. Median rent; \$135.00 per month.	1 Elementary school; enrollment, 882; total capacity, No data. 1 Intermediate school; enrollment, 596; total capacity, No data. 1 High school; enrollment, 492; total capacity, No data.	2 Parks 1 Swimming pool 6 Athletic fields 2 Tennis courts 2 Golf courses	Water source: Wells, meet current demand, no planned expansion. Sewerage: Secondary Filter System type, meets current demand, no planned expansion. Heating fuels: Oil-gas, meets current demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current demand, no planned expansion. Medical facilities: Southern Wake Hospital, (21 beds); 4 doctors and 3 dentists.

B. URBAN AREAS (CONTINUED)

NAME AND GRID REFERENCE	POPULATION	HOUSING AVAILABILITY	EDUCATION FACILITIES	RECREATION FACILITIES	UTILITIES AND FACILITIES
Garner, NC 35° 42' N 78° 37' W	Latest census, 1970; 4,923. Estimated current population, 1975; 9,590. Projected 1980; No data.	Total number of units; 3,730. Number renter occupied; 150. Number vacant year around; No data. Average number for sale; 200. Median price; \$32,000. Average number for rent; 50. Median rent; \$200.00 per month.	7 Elementary schools. 2 Intermediate schools. 1 High school. No enrollment data available.	1 Park 5 Athletic fields 3 Tennis courts 3 Golf courses	Water source: Wells and city of Raleigh, meets current demand, expan- sion is planned. Sewerage: Contracted with Raleigh, meets current demand, no planned ex- pansion. Heating fuels: Oil-gas, meets current demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current demand, no planned expansion. Medical facilities: None; 3 doctors and 6 dentists.
Hamlet, NC 34° 53' N 79° 42' W	Latest census, 1970; 4,627. Estimated current population; 4,940. Projected 1980; 5,100.	Total number of units; 1,730. Number renter occupied; 593. Number vacant year around; 133. Average number for sale; No data. Median price; No data. Average number for rent; No data. Median rent; \$67.00 per month.	3 Elementary schools; enrollment, 1,329; total capacity, 1,626. 1 Intermediate school; enrollment, 743; total capacity, 748. 1 High school; enrollment, 2,073; total capacity, 2,200.	2 Parks 6 Athletic fields 7 Tennis courts 1 Golf course Additional facilities: 1 Lake (skiing and boating)	Water source: 86 acre lake and 10 acre reservoir, meets current demand at 1.5 mgd, capacity 3 mgd, no planned expan- sion. Sewerage: High rate secondary trickling filter system type, meets current de- mand at 0.57 mgd, capacity 0.66 mgd, feasibility study presently underway for planned expansion. Heating fuels: Natural gas, Propane gas and fuel oil, meets current demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current demand at peak loads, no planned expansion. Medical facilities: Hamlet Hospital, (110 beds); 6 doctors and 4 dentists.
Laurinburg, NC 34° 46' N 79° 38' W	Latest census, 1970; 8,859. Estimated current population; 13,100. Projected 1980; 14,000.	Total number of units; 3,826. Number renter occupied; 1,100. Number vacant year around; 25. Average number for sale; 50. Median price; \$31,300. Average number for rent; 60. Median rent; \$130.00 per month.	6 Elementary schools; enrollment, 2,363; total capacity, 2,400. 7 Intermediate schools; enrollment, 3,019, total capacity, 3,000. 1 High school; enrollment, 1,592; total capacity, 1,600. 1 College; enrollment, 568; total capacity, 900.	8 Parks 1 Swimming pool 7 Athletic fields 8 Tennis courts 1 Golf course	Water source: 10 Deep wells, meets current demand, no planned expan- sion. Sewerage: Extended Aeration type, current capacity is not sufficient, does not meet Environmental Protec- tion Agency (EPA) standards, 201 facility study underway, present plants designed for expansion. Heating fuels: Oil-gas, meets cur- rent demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current demand at peak loads, no planned expansion. Medical facilities: Scotland Memorial Hospital, (172 beds); 27 doctors and 6 dentists.
Lumberton, NC 34° 37' N 79° 00' W	Latest census, 1970; 16,961. Estimated current population; 19,513. Projected 1980; 20,300.	Total number of units; 5,575. Number renter occupied; 2,383. Number vacant year around; 0. Average number for sale; 75. Median price; \$25,000; Average number for rent; No data. Median rent; No data.	5 Elementary schools; enrollment; 2,600. 2 Intermediate schools; enrollment; 2,010, total capacity; 2,250. 1 High school; enrollment, 1,045, total capacity; 1,150.	1 Park 8 Athletic fields 12 Tennis courts 1 Golf course Additional facilities: 2 Recreation centers	Water source: Lumber River, meets current demand, no planned expansion. Sewerage: Activiated sludge-extended Aeration type, meets current demand, expansion planned in next 3-4 years. Heating fuels: Oil-gas, meets current demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current demand at peak loads, planned addition of a second delivery point in 1980. Medical facilities: Southeastern Hospital, (352 beds), 1 intensive care- coronary care unit; 71 doctors and 12 dentists.
MacKall, NC 34° 40' N 79° 33' W	Latest census, 1970; 2,540. Estimated current population; 3,000. Projected 1980; 3,400.	Total number of units; 900. Number renter occupied; 400. Number vacant year around; No data. Average number for sale; No data. Median price; No data. Average number for rent; No data. Median rent; No data.	1 Elementary school. 1 Intermediate school. 1 High school. No enrollment data available.	1 Athletic field	Water source: Well, meets current demand, no planned expansion. Sewerage: Type, oxidation pond, 10 acres; aeration plant, meets current demand, no planned expansion. Heating fuels: Oil-gas, meets current demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current demand at peak loads, no planned expansion. Medical facilities: None; 2 doctors and 1 dentist.
Raeford, NC 34° 59' N 79° 14' W	Latest census, 1970; 3,180. Estimated current population; 3,380. Projected 1980; 3,480.	Total number of units; 2,036. Number renter occupied; 200. Number vacant year around; 0. Average number for sale; 25. Median price; \$35,000. Average number for rent; 200. Median rent; \$125.00 per month.	5 Elementary schools; enrollment, 2,934; total capacity, No data. 1 Intermediate school; enrollment, 817; capacity, No data. 1 High school; enrollment, 1,433; total capacity, No data.	2 Parks 4 Athletic fields 8 Tennis courts 1 Golf course	Water source: Deep wells, meets current demand, no planned expansion. Sewerage: Aeration type, meets current demand, no expansion planned until 1980-1985. Heating fuels: Oil-gas, meets current demand, no planed expansion. Electricity: Carolina Power and Light Company, meets current demand at peak loads, no planned expansion. Medical facilities: None; 3 doctors and 2 dentists.
Raleigh, NC 35° 47' N 78° 39' W	Latest census, 1970; 122,830. Estimated current population; 150,000. Projected 1980; 162,000.	Total number of units; 38,464. Number renter occupied; 17,506. Number vacant year around; No data. Average number for sale; No data. Median price; \$19,700. Average number for rent; No data. Median rent; \$82.00 per month.	55 Elementary schools. 17 Intermediate schools. 11 High schools. 6 Colleges. No enrollment data available:	100 Parks 3 swimming pools 4 Golf courses Additional facilities: Arts and Craft Center, Recreational lake.	Water source: Walnut Creek and Neuse River, inadequate during extended dry periods, Neuse Dam project is planned for expansion. Sewerage: Multi-stage type plant, meets current demand, no planned expansion. Heating fuels: Wood, coal, oil, propane and natural gas, dependent upon alloca- tions of oil, propane and natural gas, the present supply is adequate, no planned expansion. Electricity: Power source, coal and nuclear, adequate depending upon normal weather conditions, no planned expansion. Medical facilities: Mary Elizabeth Memorial Hospital, (construction underway), Rex Memorial Hospital, 1 intensive care and coronary care unit, (large expansion planned); Wake Medical Center, 1 intensive care and coronary care unit, (new construction underway); 210 doctors and 128 dentists.
Red Springs, NC 34° 49' N 79° 11' W	Latest census, 1970; 3,850. Estimated current population; 3,900. Projected 1980; 4,000.	Total number of units; 1,200. Number renter occupied; 100. Number vacant year around; 4. Average number for sale; 10. Median price; \$25,000. Average number for rent; 4. Median rent; \$125.00 per month.	1 Elementary school; enrollment, 641; total capacity, 650. 1 Intermediate school; enrollment, 553; total capacity, 575. 1 High school; enrollment, 548; total capacity, 575.	4 Parks 5 Athletic fields 5 Tennis courts	Water source: 5 Wells, meets current demand, addition of filtration capacity and overhead storage planned for expan- sion. Sewerage: Trickle filter type, system is presently overloaded, new oxidation treat- ment type plant is under construction. Heating fuels: Oil-gas-propane, meets current demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current demand at peak loads, no expan- sion planned. Medical facilities: None; 2 doc- tors and 2 dentists.

B. URBAN AREAS (CONTINUED)

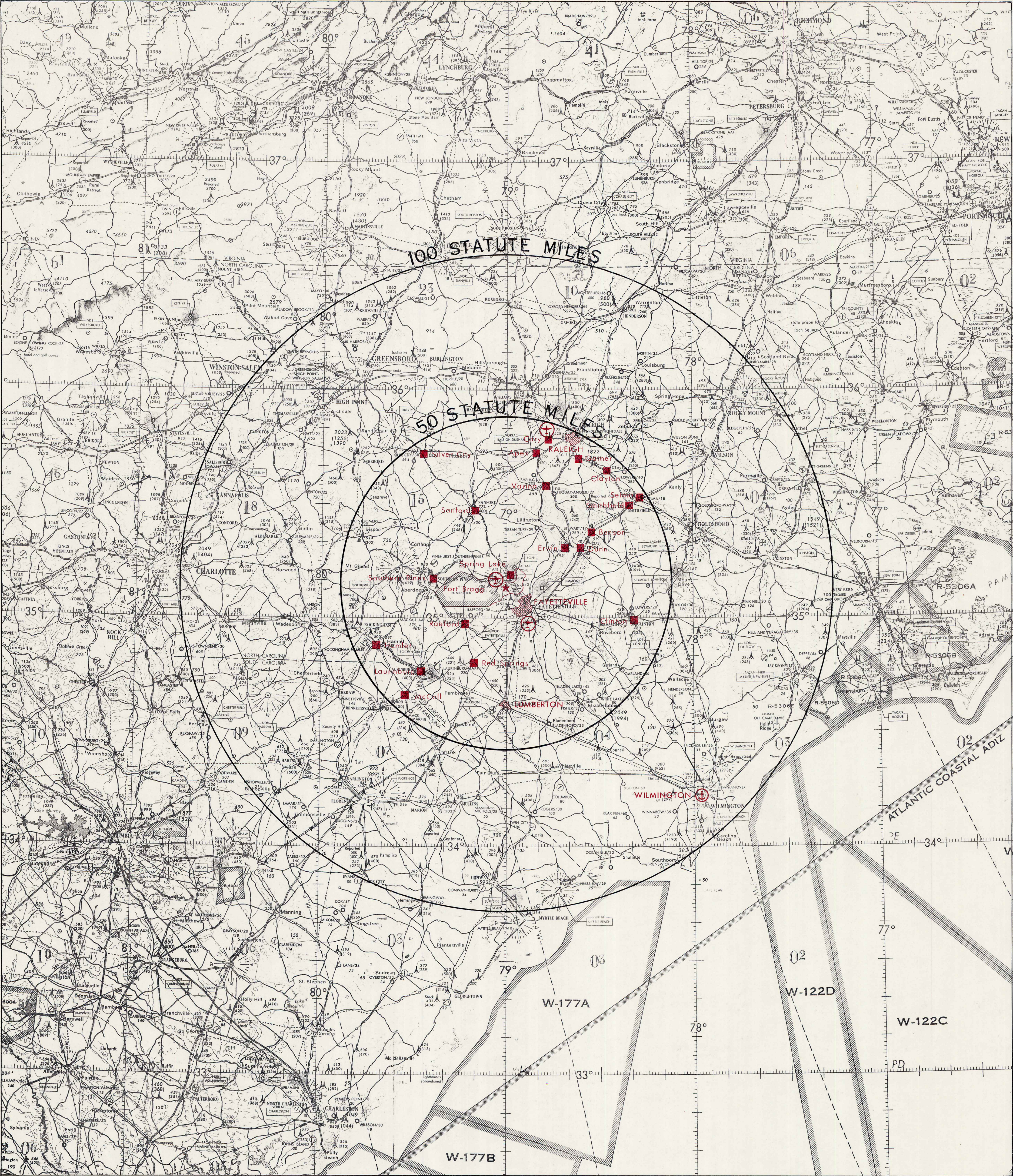
NAME AND GRID REFERENCE	POPULATION	HOUSING AVAILABILITY	EDUCATION FACILITIES	RECREATION FACILITIES	UTILITIES & FACILITIES
Sanford, NC 35° 29' N 79° 10' W	Latest census, 1970; 11,612. Estimated current population; 17,000. Projected 1980, 18,000.	Total number of units; 5,244. Number renter occupied; 1,799. Number vacant year around; 64. Average number for sale; 57. Median price; \$12,500. Average number for rent; 52. Median rent; \$90.00 per month.	9 Elementary schools; enrollment, 3,650; total capacity, 3,650. 1 High school; enrollment, 1,623; total capacity, 1,623.	13 Parks 2 Swimming pools 13 Athletic fields 16 Tennis courts 3 Golf courses Additional facilities: 4 small community buildings	Water source: Cape Fear River, meets current demand, no planned expansion. Sewerage: Activated sludge type, meets current demand, no planned expansion. Heating fuels: Oil-gas-coal, spot shortages depending on weather and availability. Electricity: Carolina Power and Light Company, Central Electric Membership Corp., meets current demand, new transmission substation planned for Jonesboro area of Sanford. Medical facilities: Lee County Hospital, (142 beds), 8 beds are intensive care and coronary care; 26 doctors and 6 dentists.
Selma, NC 35° 32' N 78° 17' W	Latest census, 1970; 4,578. Estimated current population; 4,600. Projected 1980; 5,000.	Total number of units; 1,560. Number renter occupied; 636. Number vacant year around; 50. Average number for sale; 35. Median price; \$40,000. Average number for rent; 15. Median rent; \$100.00 per month.	1 Elementary school; enrollment, 891; total capacity, 1,100. 1 Intermediate school; enrollment, 300; total capacity, 1,000. 1 High school; enrollment, 1,268; total capacity, 1,300.	2 Parks 2 Athletic fields 4 Tennis courts	Water source: Deep wells, meets current demand, no planned expansion. Sewerage: Trickling filter system type, meets current demand, regional waste treatment facility now being implemented. Heating fuels: Oil-gas, meets current demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current demand at peak load, no planned expansion. Medical facilities: None; 3 doctors and 1 dentist.
Smithfield, NC 35° 30' N 78° 20' W	Latest census, 1970; 6,677. Estimated current population; 7,500. Projected 1980; No data.	Total number of units; No data. Number renter occupied; No data. Number vacant year around; No data. Average number for sale; No data. Median price; \$8,500. Average number for rent; 10. Median rent; \$100.00 per month.	3 Elementary schools. 3 Intermediate schools. 1 High school. 1 College. No enrollment data available.	2 Parks 3 Athletic fields 9 Tennis courts 1 Golf course	Water source: Neuse River, meets current demand, no planned expansion. Sewerage: Activated sludge type plant, meets current demand, expansion underway to serve surrounding towns. Heating fuels: Oil-coal-gas, meets current demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current demand, no planned expansion. Medical facilities: Johnston Memorial Hospital, (180 beds); Johnston County Mental Health Hospital, (20 beds); 22 doctors and 8 dentists.
Siler City, NC 35° 44' N 79° 27' W	Latest census, 1970; 4,689. Estimated current population; 4,750. Projected 1980; 4,900.	Total number of units; 1,655. Number renter occupied; 505. Number vacant year around; 20. Average number for sale; 20. Median price; \$33,000. Average number for rent; 14. Median rent; \$150.00 per month.	1 Elementary school. 1 Intermediate school. No enrollment data available.	4 Parks 1 Swimming pool 2 Athletic fields 10 Tennis courts 1 Golf course	Water source: Rocky River, meets current demand, no planned expansion. Sewerage: Extended aeration type, meets current demand with 1.8 mgd capacity to be completed in 1979. Heating fuels: Oil-gas, meets current demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current demand at peak loads, no planned expansion. Medical facilities: Chatham Hospital, (85 beds); 6 doctors and 6 dentists.
Southern Pines, NC 35° 10' N 79° 24' W	Latest census, 1970; 5,937. Estimated current population; 8,228. Projected 1980; 8,630.	Total number of units; 2,145. Number renter occupied; 761. Number vacant year around; 186. Average number for sale; 8. Median price; \$30,000. Average number for rent; 51. Median rent: \$73.00 per month.	1 Elementary school; enrollment, 704; total capacity, 700. 1 Intermediate school; enrollment, 900; total capacity, 900.	5 Parks 1 Swimming pool 2 Athletic fields 27 Tennis courts 4 Golf courses	Water source: Impoundment on Mill Creek, presently at maximum capacity, plan to connect to Moore County water system. Sewerage: Secondary filtration type, meets current demand, plan to connect to Moore County sewer system. Heating fuels: Oil-coal, meets current demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current demand at peak loads, no planned expansion. Medical facilities: Nursing Hospital, (75 beds); 10 doctors and 7 dentists.
Spring Lake, NC 35° 12' N 78° 59' W	Latest census, 1970; 3,900. Estimated current population; 6,300. Projected 1980; 8,500.	Total number of units; 2,077. Number renter occupied; 1,150. Number vacant year around; 0. Average number for sale; 175. Median price; \$16,000. Average number for rent; 400. Median rent; \$120.00 per month.	2 Elementary schools; enrollment, 1,069; total capacity, 1,425. 1 Intermediate school; enrollment, 940, total capacity, 1,200.	1 Park 1 Athletic field 2 Tennis courts Additional facilities: Outdoor volleyball and basketball courts	Water source: 6 wells, meets current demand, new storage tank, additional well and distribution lines planned. Sewerage: Secondary treatment type, meets current demand, new 1.5 mgd plant under construction. Heating fuels: Oil-propane, meets current demand, no planned expansion. Electricity: Carolina Power and Light Company, meets current demand, no planned expansion. Medical facilities: None; 0 doctors and 1 dentist.

C. PORTS

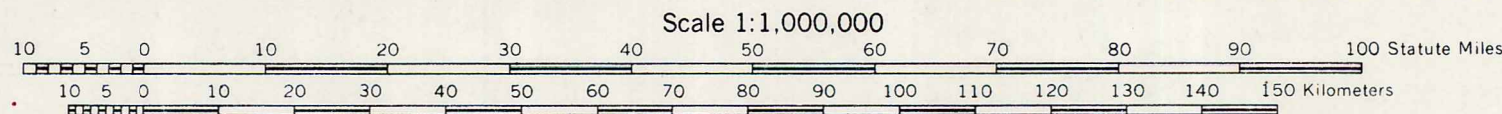
NAME AND GRID REFERENCE	TYPE AND GENERAL CONDITION	FACTORS LIMITING LARGEST VESSEL	HYDROLOGICAL CONDITIONS AND UNUSUAL GEOPHYSICAL CONDITIONS	PIERS AND WHARVES	MECHANICAL HANDLING FACILITIES	STORAGE FACILITIES	PORT CLEARANCE FACILITIES	REMARKS
Wilmington, North Carolina, TN278876	Type: Natural. Cape Fear River estuary in good condition.	Approaches: Channel design depth 11.5 m (38 ft) width 122m (400 ft). Anchorages: Design depth 11.5 m (38 ft), no freeswining berths. Turning basin is 355 m (1165 ft). Alongside Berths: Design depth 11.5 m (38 ft) at State Ports Authority Wharf; 10 m (32 ft) at Almont Wharf. Maximum length at State Ports Authority Wharf's longest section 853 m (2,800 ft); Almont's longest berth is 198 m (650 ft).	The port is virtually unaffected by tides due to its estuarine nature and extreme distance from the open sea. Maximum tidal range is 1 m (3.5 ft) to 1.2 m (4 ft) with only slight daily change.	There are eleven T-head petroleum piers, six of which are also capable of handling chemicals. There are two additional T-head piers for chemicals only. Majority of piers are timber pile supports with concrete deck. There are two major wharf areas. State Ports Authority has 1,841 m (6,040 ft) of continuous concrete wharf which is 3 m (12 ft) above Mean Low Level Water. Almont Shipping has 3 berths, the longest of which is 198 m (650 ft) with a maximum depth of 10 m (32 ft).	Heavy equipment at State Ports Authority consists of one 225-ton gantry crane, one 115-ton gantry crane, two 45-ton gantry cranes, plus two large containerized-freight cranes. Almont Shipping has one 225-ton and two 25-ton gantry cranes and one 85-ton floating derrick.	Covered: State Ports Authority 141,451 m2 (1,522,582 ft2); Almont Shipping 63,492 m2 (70,000 ft2); Other 57,228 m2 (616,000 ft2) Open: State Ports Authority 32.4 acres; Almont Shipping 23 acres Refrigerated: 2,787 m2 (30,000 ft2) Petrochem: Petroleum 772,730,420 liters (204,155,990 gal or 4,860,857 BBL); Chemical 36,033,200 liters (9,520,000 gal)	Railroad: Seaboard Coast Line is only line available. Highways: Highway 17 runs north-south along coast, highway 421 north and highway 76 west. Waterways: Cape Fear River is navigable for barge traffic as far as Fayetteville, N.C.	State Ports Authority will add 26 acres of paved open storage in the near future. Sunny Point Army Terminal is capable of providing additional port facilities.

FORT BRAGG, NORTH CAROLINA
TERRAIN ANALYSIS

ONC G-21 The United States



Cartographic and reproduction support provided by the 63D
Engineer Company (Topographic) (Corps), Ft. Bragg,
North Carolina, 28307, November 1977



Prepared by the 283D Engineer Detachment (Terrain) under
the direction of the Terrain Analysis Center, US Army Engineer
Topographic Laboratories, Ft. Belvoir, Virginia, 22060

OFF-POST FEATURES

- CANTONMENT AREA ★
- URBAN AREA (SMALL) ■
- URBAN AREA (LARGE) ■
- AIRFIELD ⊕
- PORT ⊕

IV. LIST OF SOURCES

DOCUMENTS

1. Air Weather Service Climatic Brief for Pope AFB. Environmental Technical Application Center, U.S. Air Force, Scott AFB, Ill.
2. DOD Flight Information Publication, Low Altitude Instrument Approach Procedures, East United States. 24 March 1977. Volume 8. The Defense Mapping Agency Aerospace Center, St. Louis Air Force Station, Mo.
3. DOD Flight Information Publication, IFR-Supplement, United States. 14 August 1975. The Defense Mapping Agency Aerospace Center, St. Louis Air Force Station, Mo.
4. DOD Flight Information Publication, VFR Supplement, United States. 14 August 1975. The Defense Mapping Agency Aerospace Center, St. Louis Air Force Station, Mo.
5. Fort Bragg Master Plan, Tabulation of Existing and Required Facilities. 14 December 1976. Master Planning Branch, Directorate of Facilities Engineering, Fort Bragg, N.C.
6. Fort Bragg Underground Water Study. Compiled by Edward M. Meyland and Gerald J. Kraynak. Unpublished and undated.
7. Geology and Ground-Water Resources of the Fayetteville Area. 1961. North Carolina Department of Water Resources, Raleigh, N.C. Ground-Water Bulletin NO. 3.
8. Lexicon of Geologic Names of the United States for 1936 - 1960. 1966. Grace C. Keraber and others. Geological Survey Bulletin 1200.
9. Limnological Survey of Fort Bragg for 1975. Fish and Wildlife Section, Directorate of Facilities Engineering, Fort Bragg., N.C. Undated and Unpublished.
10. Ports of the World 1973. Benn Brothers Limited, London England.
11. Water Resources Data for North Carolina, Water Year 1975. U.S. Geological Survey Water Data Report N.C.-75-1.

MAPS

12. Fort Bragg Installation Map of Fire Breaks. 1:50,000. 1 January 1977. Directorate of Facilities Engineering, Fort Bragg, N.C.
13. Fort Bragg Installation Map of Hardsurfaced Roads on Fort Bragg. 1:50,000. 6 October 1975. Directorate of Facilities Engineering, Fort Bragg, N.C.
14. Fort Bragg Installation Map of Ranges and Training Areas. 1:50,000. 21 January 1976.
15. Fort Bragg Installation Map of Authorized Tank Trails on Fort Bragg. 1:50,000. Undated. Directorate of Facilities Engineering, Fort Bragg, N.C.

AERIAL PHOTOGRAPHY

16. Aerial Photography. Approximate scale 1:14,000. Black and White contact prints. July-September 1974. Furnished by 518th Military Intelligence Detachment.
17. Aerial Photography. Approximate scale 1:52,500. Black and White contact prints. June 1976. Furnished by 518th Military Intelligence Detachment.

PERSONAL COMMUNICATION

18. Mr. Bruce Anderson. April 1977. Environmental Branch, Directorate of Facilities Engineering, Fort Bragg, N.C. Personal Visit.
19. Mr. James R. Athey. April 1977. Deputy Installation Range Officer, G-3 Range Branch, Fort Bragg, N.C. Personal Visit.
20. Mr. T. W. Bell. June 1977. Chief of Billeting, Housing Division, Directorate of Industrial Operations, Fort Bragg, N.C. Telephone Conversation.
21. Mr. D. R. Dupree. March 1977. District Engineer, North Carolina Department of Transportation, Fayetteville, N.C. Telephone Conversation.
22. Mr. Warren M. Fee. March 1977. Assistant Chief of Master Planning, Directorate of Facilities Engineering, Fort Bragg, N.C. Personal Visit.
23. Mr. Earl Godwin. February 1977. Agent, Seaboard Coastline, Fayetteville, N.C. Telephone Conversation.
24. Mr. Brooks Hale. May 1977. Cumberland-Hoke County Soils Survey Party. U.S. Department of Agriculture, Soil Conservation Service, Fayetteville, N.C. Personal Visit.
25. Mr. Julian Odum. February 1977. Cape Fear Railway, Fort Bragg, N.C. Telephone Conversation.
26. Mr. James M. Pierce. March 1977. Chief of Master Planning Branch, Directorate of Facilities Engineering, Fort Bragg, N.C. Personal Visit.
27. Mr. Pittman. March 1977. Division Engineers Office, Seaboard Coastline, Rocky Mount, N.C. Telephone Conversation.
28. Mr. Danny Sewell. January 1977. Management Forester, Forestry Section, Directorate of Facilities Engineering, Fort Bragg, N.C. Personal Visit.
29. North Carolina State Ports Authority, Wilimington, N.C. Personal Visit.
30. Office of the Captain of the Port, United States Coast Guard, Wilmington, N.C. Personal Visit.